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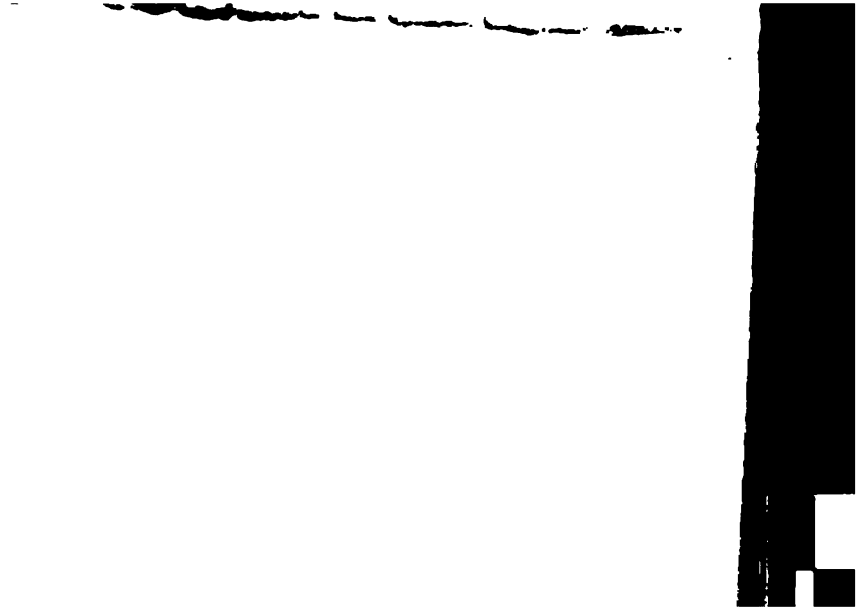

THE

CARE OF THE BABY

A Manual for Mothers and Nurses

CONTAINING

PRACTICAL DIRECTIONS FOR THE MANAGEMENT OF INFANCY AND CHILDHOOD IN HEALTH AND IN DISEASE

BY

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PREFACE TO THE FOURTH EDITION.

THE rapid exhaustion of the third edition has rendered the publication of a fourth necessary. The text of the volume has been revised throughout, and such additions and corrections made as the passing of time and the advancement of knowledge have made advisable. A large number of illustrations have been added, and others, which required it, have been altered. The author feels as strongly as ever, as he has expressed himself in previous editions, that the choice of food for a baby is so difficult a problem that no one but a trained physician should attempt it. Nevertheless he is well aware of the existence of great numbers of instances, some of which have come to his personal notice, where parents have been thrown absolutely upon their own resources in this matter. In a *Second Appendix*, therefore, he has given a fuller explanation of the principles which govern physicians in the selection of an infant's diet in health and in illness, as well as some formulæ which, he hopes, may serve as a guide to those so unfortunately situated that they may need to study this portion of the volume. All others he urgently advises to let this matter rest entirely in the physician's hands.

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PREFACE TO THE THIRD EDITION.

THE continued success of this "Manual" renders a third edition necessary. Every part of the book has been carefully revised, and the effort made to bring it thoroughly up to date. A large number of illustrations have been added, and a few, to which objection had been raised, omitted. Several new recipes have been included in the Appendix. For a new revision of special parts the author again expresses his thanks to the gentlemen mentioned in the earlier preface, and to Dr. J. H. Jopson, his colleague at the Children's Hospital.

PREFACE TO THE SECOND EDITION.

THE very gratifying success which the first edition has met has made the author desirous of bringing the present one thoroughly up to the demands of the times. He has therefore submitted it to a complete revision, enlarging it considerably and adding several new illustrations. He would again emphasize the statement made repeatedly throughout the volume, that the chapter on "The Sick Baby" is not intended to supplant the physician. This he considers impossible. It is designed especially for mothers in emergency, where medical aid cannot be obtained.

PREFACE.

THE author has endeavored in the following pages to furnish a reliable guide for mothers anxious to inform themselves with regard to the best way of caring for their children in sickness and in health.

The first chapter of the book discusses the hygiene of pregnancy, the method of calculating the date of confinement, and similar data. The characteristics of a healthy baby are considered in the second chapter, and the growth of its mind and body in the succeeding one. The chapters which follow relate to the methods of bathing, dressing, and feeding children of different ages, to the hours for sleeping, to physical and mental exercise and training, and to the proper qualities of the children's various nurses and rooms. A special effort has been made to emphasize details and to make them clear, complete, and thoroughly up to date.

The chapter upon the baby's diseases has been written particularly for those mothers who, through various circumstances, are unable to have a physician constantly within a moment's call. It contains a description of the symptoms by which we may know that disease is present; a consideration of the nursing of sick children; a concise *résumé* of the commonest diseases of infancy

and childhood; and directions for the management of various accidents, including, among others, drowning and the swallowing of poisons.

Such illustrations have been inserted as, it is thought, will make more plain the meaning of the text. To avoid repetition throughout the book, various recipes for food or medicine, as well as remarks on the employment of baths of various sorts in sickness, of poultices, disinfectants, massage, and the like, have been placed in the Appendix. Here also are tables showing the proper proportionate doses at different ages, the doses of many of the remedies most commonly given to children, the contents of the emergency medicine closet, etc. The numbered references scattered throughout the text of the book refer to corresponding paragraphs in the Appendix.

The author has endeavored to make his statements plain and easily understood, yet scientifically accurate, in ·ie hope that the volume may be of service not only to others and nurses, but also to medical students and to se practitioners whose opportunities for observing ildren have been limited. With what his own exrience with children has led him to believe would : most helpful, he has combined those teachings in ther books of like nature which have seemed to him of st value; and he takes this opportunity to acknowdge his indebtedness to previous writers, not forting the contributors to the files of that excellent gazine for mothers, "Babyhood." He would also

express his grateful thanks to his colleagues at the University of Pennsylvania and at the Philadelphia Polyclinic and School for Graduates in Medicine, Professors Hirst, Roberts, Randall, Van Harlingen, and Risley, who have revised for him, with many valuable suggestions, the pages bearing respectively upon the hygiene of pregnancy and of the nursing mother, surgical affections, diseases of the ear, diseases of the skin, and diseases of the eye.

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THE CARE OF THE BABY.

INTRODUCTION.

It seems often to be taken for granted that the young mother will understand by a sort of intuition the care which her baby requires, as though it needed no more than a newborn animal of some lower order of life. The fact is that such a little animal, slight though its needs are when compared with those of a baby, has a parent which by instinct is far better able to care for it than is the human mother for her child.

That she knows nothing is both the mother's safeguard and her danger. Ready and anxious as she is to fit herself for her new duties, she is even by this anxiety rendered too ready to accept as gospel all that is told her about the care of her infant by those who assume to know, but who "darken counsel by words without knowledge." She becomes thus the prey of "old wives' fables" and of all sorts of gratuitous advice, the injuriousness of which is shown too late in the condition of the unfortunate child.

A well-informed monthly nurse can be of great assistance to a new mother beginning the care of her baby. Unfortunately, not all nurses are of this class, and some are full of absurd and harmful teachings and practices, while even those who are intelligent and well trained often err greatly in many points. Of all this the mother is, of course, unable to judge, unless she herself

knows what is right. The baby's grandmother, although often of great assistance, is naturally sometimes rather rusty in matters relating to the care of children. Moreover, it is most true, in the words of the old song, that

> "Times have changed since then,
> And life is a different thing,"

and many methods which were considered entirely correct years ago have since been greatly improved or even found to have been actually wrong. The mother therefore is liable to find herself, after the departure of her nurse and physician, ignorant and without reliable resources upon which to draw. Such being the case, we may profitably consider, as briefly as possible with due regard to completeness, some of the matters connected with babyhood from birth, and even before it, up to the time when childhood ceases.

Baby is, indeed, a very indefinite term, often applied by mothers to children who have far outgrown their right to the name as strictly used. But "baby" the child still is to its mother, unless a second comer has added dignity to the first-born's position, so "baby" it shall be to us in our present study of its wants; for we must not forget that a child even of several years demands just as great care, although of a different sort, as it did when still in arms.

From a strictly medical standpoint babyhood and childhood are very commonly divided into three periods, concerning the exact limits of which physicians are not altogether agreed. Most conveniently we may speak of, first, *infancy*, which extends from birth to the age of two years; second, *early childhood*, from the age of two to that of six years; and, third, *later childhood*, from the age of six years to that of *puberty*—that is, thirteen to

fifteen years. We shall repeatedly have occasion during our study of the subject to use these terms as thus defined.

No observations made in the following pages concerning the baby when ill are intended to do away with the physician any more than they are meant to make a mother entirely dependent upon him. Their object is only to help her understand what she can do without medical advice, and how she shall do it; when she shall call a physician to her aid, and what she shall do before he comes. It is hoped that they may be useful especially to the many mothers who live far removed from a physician.

CHAPTER I.

BEFORE THE BABY COMES.

IT is a fact which ought never to be forgotten that the proper care of the baby begins long before it is born, for to produce healthy offspring the parents must themselves be healthy. Although the manner of living always healthily is a subject far beyond the province of this volume, at least some attention must be given here to the way in which a woman should live after she has discovered that she is to be a mother. How she shall order her life should certainly be her first consideration, for, whether or not the coming of the baby is a welcome thought, her responsibility for the future welfare of the child that is to be remains the same. She has no right to act in any way that may injure another human life.

Signs of Pregnancy.—Whether she is really pregnant is naturally the first question, and one concerning which a woman does not ordinarily consult her physician. There are a large number of *presumptive* signs of pregnancy, many of which she is capable of observing her-

self. It is proper to remark that none of these indicate anything further than the probable existence of pregnancy. There are only a few *positive* signs, and these can be detected by the physician alone.

The most striking and valuable of the presumptive signs is, of course, the cessation of the monthly periods; yet even this is not entirely reliable, for various other causes may account for it. It sometimes happens that menstruation is absent for several months in early married life, and yet that conception has not taken place; while, on the other hand, the monthly periods occasionally come on regularly during a part or, rarely, all of pregnancy, although in this case they are usually scanty and of short duration. Finally, a woman may conceive while still nursing and before menstruation has been re-established. As a rule, however, the cessation of menstruation in a married woman previously regular indicates pregnancy.

Enlargement of the abdomen is another important sign, although usually not detected before the fourth month of pregnancy. A valuable indication is enlargement of the breasts with tenderness of the nipples and a decided widening and browning of the pink ring, or *areola*, around each of these. Sometimes a small amount of watery fluid is secreted later. The enlargement of the breasts begins in some instances in the second month of pregnancy, and becomes quite noticeable in the fourth and fifth months. The alteration of the areola commences to be visible by the end of the second month.

"Morning sickness" is a symptom present in many women. It consists usually in the occurrence of nausea, and perhaps vomiting, in the early morning, but it sometimes lasts all day. It appears generally in the second month, occurs every day or less frequently, and lasts only

through the third month; but in bad cases it may continue through the whole period, and become dangerous from the difficulty the patient experiences in retaining food.

"Quickening" is a sign of much value, but, like the others, only presumptive. By this term is meant the detection by the mother of the movements of the child within her. It was once thought that the child received life at this time, but this was, of course, erroneous. The child is just as much alive before quickening as afterward, but its early movements are too feeble to be perceived until four or four and a half months after conception. The movements at first give the sensation of a feeble fluttering, but soon become much more evident, and then feel like sudden, sharp strokes or kicks, and are often the cause of considerable or even great discomfort.

There are a number of other less important presumptive signs, such as variations in appetite, with abnormal hunger, or "longings," for unusual kinds of food. Again, the whole disposition may be changed completely for the time, and she who was formerly vivacious, cheerful, and good-natured may become dull and melancholic, full of the gloomiest forebodings, or excessively irritable. Sometimes, but, unfortunately, less frequently, just the reverse of this takes place, and the disposition is at the best during pregnancy.

The exact time at which the baby may be expected is a matter of great importance, since so many preparations must be made for its arrival. Confinement occurs 272 to 275 days from the date of conception; but, as this date can rarely be determined exactly, it is customary to reckon that pregnancy lasts 10 menstrual months of 28 days each—that is, 280 days—from the first day of the last menstrual period. This equals 40 weeks, or a little

over 9 calendar months. A ready rule for determining the date on which confinement may be expected is to count three months backward from the first day of the last menstruation and to add seven days to the date obtained. Thus, if the last period began on February 3, three months backward would bring it to November 3, and seven days added would make November 10 the probable date. Since, however, the months are not of equal length, various tables have been constructed for a more accurate and convenient method of computing the date. The one upon the opposite page is a form very commonly in use.

This method of reckoning is, of course, only approximate even when the exact date is known on which it is supposed that conception occurred. It is therefore only safe to consider the calculated date of confinement as the middle of a period of two weeks, on any day of which labor may naturally take place. Where it is impossible to reckon from the last menstrual period, it is customary to count from the date of quickening. Four and a half months from this date, or five months in the case of a woman pregnant not for the first time, will give the approximate date of confinement, although this is not very accurate.

Management of Pregnancy.—The prospective mother has, then, forty weeks during which she shall conduct herself in the way that will exert the most powerful influence for good upon the health of the coming little one. Bathing in tepid water may be enjoyed daily, but very hot or very cold baths, sea-bathing, and hot foot-baths are dangerous. Moderate exercise in the open air is important, while the constant occupancy of close, heated rooms is distinctly harmful. All the pure air possible should be obtained. Walking is beneficial, as is driving

TABLE FOR CALCULATING THE DATE OF CONFINEMENT.

Jan.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Oct.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	Nov.
Feb.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28				
Nov.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5				Dec.
Mar.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Dec.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	Jan.
April.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Jan.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4		Feb.
May.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Feb.	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	Mar.
June.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Mar.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6		April.
July.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
April.	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	May.
Aug.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
May.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	June.
Sept.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
June.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7		July.
Oct.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
July.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	Aug.
Nov.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Aug.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6		Sept.
Dec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Sept.	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	Oct.

Supposing the upper figure in each pair of horizontal lines to represent the first day of the last menstrual period, the gure beneath it, with the month designated in the margin, will show the probable date of confinement.

or automobiling over smooth roads or riding in street cars; but horseback riding, bicycling, dancing, driving over rough roads, lifting, straining of any kind, the use of the sewing-machine, and all other violent or long-continued forms of exercise ought sedulously to be avoided. Particular care must be observed at the times at which the menstrual period would naturally occur if pregnancy did not exist. Sea-voyages may be dangerous, on account of the liability to sea-sickness and the straining which accompanies it. There is a very injurious custom among some women—that of refusing to go out of the house from the time when the alteration in shape becomes marked. Even were concealment of the figure impossible, health rather than appearance should be the first consideration.

Amusement is, of course, necessary. There is no reason why pleasures should be abandoned, provided they are made entirely secondary to health. So, too, the frequenting of the theatre and of similar places of amusement is often harmless, especially if it is found to exert no unduly exciting influence upon the emotions. In many women, however, the emotional nature is unusually susceptible during pregnancy, and crowded places and exciting reading must be avoided. No amusements should be allowed to interfere with the obtaining of the large amount of sleep which is always required at this time.

This brings us naturally to the consideration of the management of the mental condition. The unusually impressionable state characteristic of pregnancy renders a woman very prone to become the subject of great despondency. This she can relieve to a certain extent by the recollection that it is only a symptom shared by a great many others, and that there is no reason for the conviction that she will never survive the birth of her child.

It is, of course, much more difficult to follow this advice than to give it. Consequently it is important that she avoid adding to her fears by listening to detailed accounts of the trials of other women under similar conditions, or by reading depressing novels or witnessing distressing sights. The experiencing of frights, the seeing of deformed persons or animals, the hearing of bad news, and so on—*maternal impressions*, as they have been called—are very commonly supposed to exert a powerful influence in producing some deformity or defect in the child; while the looking at beautiful objects, the listening to delightful music, and the reading of elevating books are also claimed to affect favorably the body or mind of the baby. It is now admitted generally that no such influences are exerted. The various instances of maternal impression of which we often hear are simply imaginary, and are coincidences only. The time at which most malformations or other "markings" develop is very early in the life of the child within the womb—much before the various influences which the mother fears have generally been received. No prospective mother need give herself any anxiety about the matter. On the other hand, there does exist the very certain influence of inheritance. If a mother wishes her child to be healthy of body and beautiful of mind, she must previously have cultivated her own mind and body through years of training.

The diet during pregnancy should be generous yet easily digestible. There is no reason why the usual diet should be altered at all, if it has been healthful and well assimilated, except that it is sometimes better to have the evening meal light. It is also wiser to eat meat only once a day, in order to throw less work upon the kidneys. There is no truth in the fancy that certain articles of food eaten can exert any special influence

upon the development of the child or the ease of childbirth.

The dress is very important. The skin should be well protected against changes of temperature by wearing woollen clothing both in summer and in winter. All garments must be loose enough not to interfere in the slightest with the progressive enlargement of the abdomen and breasts. No woman with the slightest regard for the health of her child or for her own safety will resort to tight lacing in the endeavor to conceal her state as long as possible. From the very beginning of pregnancy she should abandon the corset altogether or use one especially adapted to prevent pressure, and should avoid circular garters and suspend the clothing from the shoulders as far as possible. There are now various dress-reform systems on the market which answer the purpose very well, and which are certainly to be commended during pregnancy, even though a woman cannot persuade herself to wear them always. High-heeled shoes ought not to be worn, as they put a strain on the back and the pelvis and may do serious damage. With the exhibition of proper taste and skill the dress can be so fashioned that no woman need have cause to regard herself as unfit to appear in public.

Fig. 1.—Abdominal belt.

The abdomen may grow very large, especially in women who have previously borne children, and may demand some support. A binder will give relief, or, better still, one of the abdominal supporters which are especially made for this purpose (Fig. 1). A week or two before confinement the abdomen usually seems to grow a little smaller, the result of the settling of the womb lower into the pelvis.

The care of the breasts must be commenced early, since upon this the ability to nurse the baby may largely depend. The entire removal of the pressure of the clothing allows the breasts full opportunity to grow properly. They should, however, be covered warmly, and be well supported if their increasing size renders their weight uncomfortable. Specially made bandages may be purchased for this purpose. Particular attention must be given to the nipples, in order both to render them of a shape which the child can readily grasp and to make them secure later against the development of painful fissures. Sometimes there is a tendency to the formation on the nipples of a large amount of scaling skin. These scales must be washed away frequently if they show a disposition to adhere. If, as the breast grows, the nipple is found not to stand out well, or if the nipple is irritated by the clothing, a nipple-protector of some sort may be worn constantly as an additional safeguard and aid to development. One made of lead is on the market, and can be recommended (Fig. 2). This should not be done except by medical advice. In cases of flat nipples it is frequently of advantage to endeavor every day to pull them very gently with the fingers out from the breast. Another excellent plan for accomplishing this end is the use of a breast-pump. The form shown in the illustration (Fig. 3) is one of the best, as some pumps are too powerful and are apt to do injury. Traction by the fingers or by the pump should not be used in a way to do the slightest harm, and no treatment of this sort should be begun

FIG. 2.—Nipple shield.

FIG. 3.—Breast-pump.

until the last four weeks of pregnancy, lest a miscarriage be produced in women liable to it. With the beginning of the last month a hardening process for the nipples ought to be instituted, in order to prevent the formation of fissures later. A useful plan is that of bathing the nipples morning and night with a tannin solution (Appendix, 77), upon a piece of absorbent cotton.

The question often arises whether there is any way of determining the sex of the coming child, or any course which the mother can pursue to influence it. The very fact that so many different methods are heard of is excellent proof that none of them are good for much. The truth is that there is absolutely no reliable means known to medical science for discovering in advance whether the child will be a boy or a girl, and not the slightest power of doing anything that will have a particle of influence in producing a child of the desired sex.

Disorders of Pregnancy.—There are many discomforts of pregnancy for which the sufferer herself may be able to do much. If simple means do not avail, she should not neglect to consult her physician, for there is surely no need of enduring any inconvenience if it can be avoided. Constipation is exceedingly common at this time. The use of some laxative food, such as oatmeal porridge, green vegetables, figs, oranges, or stewed fruit, especially prunes, is often sufficiently effective. If not, mild drugs may be used without danger, as, for example, Seidlitz powders, or such mineral waters, in small doses before breakfast, as Hunyadi, Rubinat, Apenta, and the like, or some gentle laxative pill prescribed by the attending physician. All strong purgatives and patent medicines are to be shunned. Enemata of tepid water may be used safely. Suppositories of glycerine or of gluten, or very small glycerine enemata are also of service.

Irritability of the bladder is very common. It is relieved

to some extent by the recumbent position, which takes away the pressure of the heavy womb. If the urine is high-colored and causes smarting, a physician's advice should be had. Hemorrhoids, or piles, not infrequently develop in the later months of pregnancy. Very hot fomentations or sponging with very cold water, done frequently and followed by boric-acid-and-zinc ointment (Appendix, 75), often affords great relief. Rest in the recumbent position is also of value. If the bowels are kept regular and all straining is avoided, hemorrhoids will not be so liable to form. Varicose veins or a painful swelling of the legs and lower parts of the body is often very annoying as pregnancy advances. Rest lying down is one of the best means of relief, as is rubbing of the legs in an upward direction. It is often necessary to apply a soft flannel roller bandage from the toes nearly to the hips. This should be done before getting out of bed in the morning. If varicose veins grow at all large, a physician should be consulted, as there is danger of their bursting. Should the face swell, as well as the legs, it is probable that the kidneys are affected. As this is a dangerous complication, no time should be lost in obtaining medical advice. Indeed, a specimen of the urine should be sent to the physician from time to time during pregnancy, to make sure that no disorder of the kidneys is developing insidiously.

A profuse flow of saliva sometimes occurs. It is occasionally relieved by a mouth-wash of tincture of myrrh in water. Toothache is not infrequent. If neuralgic only, it is often relieved by the use of a hot-water bag; but, unfortunately, it is not always of this nature. Decay of the teeth is very apt to occur during pregnancy, and it is best to consult a dentist occasionally, even though there be no toothache. No painful dental operation should be undergone if it possibly can be avoided.

It sometimes happens that the hair falls out badly during pregnancy. This, like the toothache, may be only a temporary matter; but as it may be permanent, it is well to receive treatment for it.

There is no reason whatever why a woman should suffer from morning sickness without at least making an effort to have it relieved. A plan frequently effectual is to take a cup of coffee, tea, broth, or hot milk early in the morning, without sitting up in bed, and then to rest or to sleep again for a short time before rising. If the vomiting persist during the day, food ought to be taken in very small amounts at frequent intervals. Of course, too, the food ought to be digestible and the bowels kept regular. Should the vomiting be severe and not be relieved in the way mentioned, medicines ordered by the physician will often control it.

Heartburn and other evidences of indigestion, which are quite common in pregnancy, are often promptly relieved by soda-mint, and, if not, they should be prescribed for by the attending physician. Leucorrhœa is sometimes decidedly troublesome and even very irritating. Injections should not be used unless ordered by a physician, and then only with a very gentle stream from a fountain syringe (Fig. 4). The bag of the syringe must never be elevated more than a foot or two above the hips. Externally, a solution of boric acid in water (Appendix, 79) may be used for bathing if there is any soreness, followed by the application of an ointment of oxide of zinc or of a powder of talc.

FIG. 4.—Fountain syringe.

Preparations for Confinement.—Finally, we must consider briefly some of the various preparations to be made for the confinement itself.

The following list comprises the articles for the mother's use that should be provided in advance:

Hand-towels.

Ether, one-half pound.

Brandy, two ounces.

Antiseptic tablets (corrosive sublimate), one bottle.

Braided silk, or a skein of bobbin (for tying the cord), sterilized before being used.

A fountain syringe.

A new soft-rubber catheter.

One or two china basins.

A bed-pan.

Absorbent cotton, small package.

Salicylated cotton, one-pound package.

Carbolized gauze, one can.

Bichloride tablets.

Boric acid, powdered.

New rubber cloth, one and a half yards wide, two yards long.

Nursery cloth, eight yards (for pads).

Unbleached muslin, two yards long, eighteen inches wide (for binders).

Carbolized vaseline, one-ounce bottle.

Large oil-cloth or old rug (to protect the carpet).

Large safety-pins.

Fluid extract of ergot (bought one week before confinement).

Hot water in abundance (at time of confinement).

The room which the prospective mother will occupy will ordinarily be her usual bed-room. It ought to be light, well ventilated, and large. It is a great convenience if there is a communicating room for the monthly nurse, as this leaves to the mother the exclusive use of her own. The bed, when ready for the confinement, should be so situated that it is out of draughts and that

its sides are not against the wall. The mattress should be of hair or other firm material, but certainly not of feathers; and extending entirely across it, at the level of the hips, there should be the strip of rubber cloth, sterilized before it is used. Over this is spread the lower sheet of the bed, and finally, on the spot where the hips will lie, a protecting pad for the purpose of catching and absorbing the discharges. This pad should be a yard or more square. It is made of nursery cloth, and is pinned to the sheet with safety-pins. Three or four should be provided. Under the bed is placed the oil-cloth or old rug. Many of these arrangements for sparing the bed and the floor are sometimes substituted by special rubber apparatus.

The "nursery cloth" referred to consists of two layers of muslin with a layer of cotton quilted between them. It may be bought in the shops. It should be boiled for half an hour in a clothes-boiler, dried thoroughly, pinned up in a sheet, and put away out of the dust.

The napkins which the mother will use should not be made until just before the confinement. She must, when making them, see that her hands are very clean, and she should put them away, when finished, in a clean place free from dust. It is far better, indeed, that the nurse make the napkins as needed. Each one is composed of an oblong wad of salicylated cotton enveloped in carbolized gauze folded in the usual form. Three or four dozen will probably be needed. All soiled napkins must be burnt at once.

The abdominal bandages or "binders," of which there should be several, are composed of washed unbleached muslin half a yard wide and two or three feet long. The ligature for tying the cord should be soaked in sublimate solution before being used (Appendix, 82).

It is more convenient, although more expensive, to purchase the various articles needed in the form of an "ob-

stetrical outfit," which can be procured through surgical instrument makers.

If the nurse is in the house some time before the confinement, as she should be, she will decide when to send for the physician, and thus relieve the patient of responsibility in the matter. If she has not yet come, the prospective mother will suspect that labor is about to begin from the occurrence of *true* pains. These are felt either in the back or in front, last a quarter to half a minute, and come on rather regularly. The intervals between them at first last, perhaps, three-quarters of an hour, but gradually grow shorter, while the pains grow more severe and center more and more in the back. There is often a slight discharge of blood (sometimes called a "show"), which is almost a positive proof that labor is about to commence. *False* pains, as they are usually called, quite frequently occur at intervals during the two weeks before confinement. They are situated in the abdomen and have no element of regularity about them.

The "bag of waters" is a sac containing a peculiar fluid in which the child floats. Its rupture is indicated by a continuous flowing or sudden gush of liquid. Should this happen, the physician must be sent for at once, even though there has been little or no pain. The rupture may take place, it is true, some days before the child is born, but much more frequently it does not occur until labor has really commenced, or even is nearly over.

At the very beginning of the confinement the bowels ought to be emptied by an enema unless they have been moved just before.

After labor is actually under way and the physician has arrived the patient has no further responsibility, and we need not consider the treatment that she requires or the various steps in the birth of the child. After its birth her physician will still attend to her needs and prescribe

the form of diet best suited to her. When she is out of bed again and thrown on her own responsibility, her chief care for herself with regard to the baby must be to provide for it a suitable supply of milk. This can be discussed more conveniently in the chapter which treats of Feeding the Baby.

CHAPTER II.

THE BABY.

THE new-born baby is certainly not an object of beauty. Even its mother could hardly think it so, did she see it at the moment of its birth, before it has experienced the improving influences of its first toilet—wet and more or less covered, as it is, with a peculiar whitish, waxy substance. After it is washed and dressed its appearance even yet cannot be called altogether prepossessing. Still, despite its lack of beauty, its mother loves it and is naturally anxious to know whether it is "all right." Many times afterward will she be fortunate if she can tell whether all is still right with it. As without a knowledge of how a baby of any age should look and act it is impossible to recognize illness developing, our first duty is to pass in review the characteristics of a healthy child—often called *the features of health.*

A healthy and well-developed new-born infant should be plump and firm, with its bones well covered and with a soft and extremely delicate skin. This remarkable softness is due in great part to the presence everywhere of a coating of fine down, which is sometimes scarcely visible, sometimes quite abundant. The skin is of a decidedly reddish color, and only when the baby is suffering from some disease or when it is cold does it become mottled or bluish. Cold is the most frequent

cause of this, for a baby has but feeble vitality as compared with an adult.

Although a baby can weigh anywhere from 5 to 10 pounds without being considered remarkable, yet the average weight of the normal baby may be placed at from 7 to 7½ pounds. Its length is about 19 to 20 inches, with a range, however, of from 16 to 22 inches. Any child which comes within these limits of weight and length is to be called normal. Occasionally these figures are much exceeded, but not often. It must be remarked, too, that a child may be thin when born, and yet not be actually unhealthy.

Before the child is a week old its lobster-red color often fades into a no more attractive, yellowish-red tint which is due to the presence of a very slight degree of jaundice. This is of very common occurrence, and is not to be considered as evidence of disease. In this first week, also, the long down begins to fall off, and a more or less extensive shedding of the skin takes place, generally in the form of fine scales, but sometimes in shreds. This shedding always occurs, and may last a week or more, although with many babies it is almost imperceptible.

Generally before the baby is two weeks old the yellow tint has disappeared and the skin has taken on the real "baby" character which is so much admired, and which only needs to be seen to be appreciated. It is then of a clear, soft, rose-pink tint, with the palms, soles, and cheeks of a deeper rose. A warm bath or rubbing the skin renders the whole body reddish.

There are many other features about the body of a healthy baby with which we must acquaint ourselves, for, although they may seem rather uninteresting, they are matters of the greatest importance.

The *head* is remarkably large as compared with the rest of the body, being, indeed, nearly as long from the

crown to the chin as is the trunk. Immediately after birth, if this has been difficult or prolonged, the head is sometimes found squeezed into a shape which is startling, it is true, but which need cause no anxiety. (See Chapter XI., p. 299.)

The contour of a baby's head as seen from above should be round or oval. At the back of the head and at a point just behind the forehead are two spots where there is no firm bone present, and only the skin and a thin membrane cover the brain, which can be seen to pulsate through them. These spots are called the anterior and posterior fontanelles (Fig. 5). The first, the one just back of the forehead, is the larger of the two, and is the only one to the size of which the mother need give any attention. It is somewhat diamond-shaped, and should measure at birth about one inch in diameter between opposite sides. It should neither be much depressed nor bulge much. The new-born baby sometimes has a very considerable amount of hair on its head. The mother need feel no alarm at seeing this fall out to a great extent in a short time. Its nails, too, are well formed at birth, and grown fully out to the ends of the fingers.

FIG. 5.—Infant's skull: anterior fontanelle above; posterior fontanelle below.

The *tongue* during the first week of life—and, indeed, up to the time when saliva becomes more abundant—is more or less covered with a whitish fur. This is no sign of digestive disturbance, but is probably the result of the greater dryness of the mouth present at this time of life.

PLATE I.

Baby a few weeks old, showing the natural curve of the legs with the bending in of the soles. (From a photograph.)

The *chest* of a baby is poorly developed as compared with the head, and its circumference is somewhat less. The shoulders and hips are narrow, and their girth is at first less than that of the head. On the other hand, the *abdomen* is large and prominent, the result chiefly of the extraordinarily large liver which a new-born child possesses. The arms are comparatively short, and the *legs* particularly so. The latter measure very little more than the length of the trunk.

Every mother should remember that the baby at first has crooked legs, or rather what seem to be so, and that there is no cause for alarm on this account. It has the peculiar monkey-like power of turning its feet in in a way which brings the soles rather closely together. The accompanying illustration of a perfectly healthy and well-developed baby a few weeks old (Pl. I.) shows the natural bowing of the legs.

Of course there are such things as clubbing of the feet and real bowing of the legs, but these are true deformities of the joints and bones, not deceptive appearances merely.

All these various peculiarities of shape which we have been considering change gradually with the growth of the child. We shall need to study them more fully in the next chapter.

In addition to the features mentioned, it is necessary to know something of the expression of face and the position and gestures of a healthy child. The *face* of a very young baby when awake has an expression of wondering surprise. The look of intelligence which is there is only an apparent one. It is a pity, perhaps, to shatter a mother's fancy that her child notices what is going on, recognizes her, and expresses pleasure at her approach; still, the truth is that the baby at birth is about as intelligent as the sensitive plant, the leaves of

which automatically close when touched. Like the plant with its leaves, the baby automatically closes its mouth and nurses without knowing that it does it.

The color of the eyes is generally a very indefinite one —a sort of blue in all babies. However much they may be supposed at first to resemble the father's or the mother's, a change to a lighter or a darker hue is liable to occur at the age of seven or eight weeks. When a baby of any age is asleep its eyes are entirely shut and the expression is that of peaceful repose.

The *position* of its body, too, at this time is that of entire and graceful relaxation. The head is usually turned slightly to one side, and breathing goes on almost imperceptibly and without any movement of the nostrils. In the waking state the new-born baby is comparatively still, except for a really remarkable disposition to grasp anything with which its hand comes in contact. In a very short time, however, it becomes when awake almost the embodiment of perpetual motion, the legs and arms being in nearly constant although purposeless action.

The first act of the new-born child usually is to *cry*. No sound is so pleasing to the attending physician as a good, lusty cry from the little newcomer, for it shows that it has well entered on the use of the lungs which have hitherto been inactive, and that it has plenty of strength for all the functions of its new life. The mother likes to hear it too—better than she will later. There is good cause for the baby's crying at such a time, for the change from its previous existence to the contact with the chilling external air, and the comparatively rough handling which it receives, must constitute an exceedingly disagreeable experience. The sound soon ceases, however, after the child is washed and dressed and put to rest. It may be taken as a positive rule that a

baby does not cry without some reason. A cause exists, although it may be a trivial one, and the cry is the baby's only audible means of expressing its dissatisfaction with its state. The cry should be clear, and any alteration from the normal character is a valuable indication that some diseased condition is present. What these alterations are, and what they mean, we shall consider when we come to study the baby's illnesses. It is a curious fact, which may be mentioned here, that a young infant sheds no tears, no matter how hard it may cry.

Finally, we must consider some matters connected with certain of the functions of life—namely, breathing, the action of the heart as shown by the pulse, the operations of the bowels, the voiding of urine, and the condition of the temperatnre.

The *respiration* during sleep is quiet and comparatively regular. In the waking hours it exhibits a very great irregularity, which is present up to several years of age, although most marked in the first twelve months. The child often holds its breath a moment, yet apparently without any effort or any intention of doing so. A number of quick breaths may occur together, or perhaps a number of slow ones. No weight whatever is to be attached to this peculiarity, for it is entirely characteristic of infancy and early childhood.

The respiration in children up to the age of puberty is largely what is called *abdominal;* and this applies to girls as well as to boys. The heaving movement is seen to a large extent in the abdomen, the chest moving to a lesser degree. After girls reach the age of from thirteen to fifteen years the respiration is more from the chest, as it is in women.

The rapidity of breathing in children varies with the age, as can be seen from the following table:

NUMBER OF RESPIRATIONS PER MINUTE.

At birth and for the first 2 or 3 weeks	30 to 50, average about 40.
During the rest of the first year	25 to 35, average about 30.
1 to 2 years	About 28.
2 to 4 years	About 25.
4 to 15 years	20 to 25.
Adult life	16 to 18.

All these rates are from one-fifth to one-quarter less when the child is asleep, at least up to the age of four years, although after this the breathing is still slightly slower during sleep. The numbers given are average and approximate ones only, for the rate varies extraordinarily in young children. To estimate the frequency of the breathing we may watch the in-and-out movements of the abdomen, or perhaps put the hand lightly there and feel them. It is necessary to avoid the slightest excitement, since this increases the rapidity very greatly. During sleep is an excellent time for making the observation, allowing for the differences mentioned.

The *pulse* shares to a great extent the irregularity of the respiration, and the slightest excitement, such as crying or even sucking, increases its rate so much that no conclusions can be drawn from any observations made under such conditions. The less the age the truer this statement is; and a mother consequently need feel no anxiety if her child of two or three years or less has a temporary pulse-rate of 20, 30, or even more beats per minute above the standard. Not only is the pulse influenced by excitement of any sort, but even when the baby is asleep or is perfectly quiet a decided irregularity can be perceived, which is perfectly natural and to be expected, although it would be abnormal, and perhaps dangerous, in an adult. The pulse may be felt at the wrist, or, when this does not succeed—as it often will not in the first weeks of life—in the neck or over the heart itself.

Another very good method is to watch the beating of the fontanelle.

The table which follows shows the normal average pulse-rate at different ages :

	Number of Pulse-beats per Minute.
At birth	130 to 150
First month	120 to 140
1 to 6 months	About 130
6 months to 1 year	About 120
1 to 2 years	110 to 120
2 to 4 years	90 to 110
6 to 10 years	90 to 100
10 to 14 years	80 to 90
Adult life	72

This table gives the pulse-rates in children who are awake but perfectly quiet. The figures are even more approximate than in the case of respiration, owing to the great tendency to irregularity referred to, and to the extreme difficulty experienced in finding the quiet state desired. For this reason the best time to count the pulse is when the child is asleep. We must remember, however, that sleep produces a decided lessening of the speed. In children under nine years of age the slowing is 16 or 20 beats per minute; from nine to twelve years it is about 8 beats; and from twelve to fifteen years, 2 beats. The rapidity of the pulse is slightly greater in girls than in boys of equal age, but the difference is not very material.

The *bowels* of a new-born baby are generally opened once or twice during the first day of life. The passages of the first two or three days consist of a peculiar thick and sticky, odorless, blackish or greenish-black substance called *meconium*. This was produced in the bowel before the birth of the child. When the flow of mother's milk has been established the passages become canary-yellow in color, of the consistency of thick cream, have

very little odor, frequently contain small masses of undigested milk if the baby is getting more nourishment than it can entirely assimilate, and number two to four in twenty-four hours. Gradually the frequency diminishes, so that from the age of six weeks or two months to that of two years there are usually only one to three movements daily, while the yellow color is a trifle darker, the consistency greater, and the odor rather more fecal. Very often a slight greenish tinge develops a short time after the movement has occurred. This is entirely normal. It is only after the age of two years, and when the diet has been considerably varied, that the passages become completely formed and of a distinctly fecal odor. There should never be any fetid odor from a natural and perfectly healthy bowel-movement of a baby.

Nevertheless, the number of movements of the bowels may vary considerably from the statements just made without indicating actual ill-health. There may be no more than one or two movements daily, even in early life, or they may number even five or six, and yet not constitute diarrhœa unless their character is also changed.

The *urine* of a young healthy baby is generally almost like water in appearance, unirritating, has very little odor, and leaves no stain upon the diaper. Although it is generally passed within the first twenty-four hours, it not infrequently happens that the bladder is not emptied during the whole first day of life. This need not occasion any alarm, provided the baby is resting comfortably and is evidently in no distress. Just how often in twenty-four hours a baby usually passes water it is very difficult to state. Not only does it vary greatly with different children, but with the day as well, depending upon the temperature of the air or upon the amount of nourishment taken. The average is probably six to ten times a day, but there may at times be an evacuation of urine every

hour, or perhaps not for ten or more hours, and yet the child be in perfect health. As age increases and control of the bladder is acquired, the frequency diminishes to about six times a day or less.

The amount of urine evacuated varies with the age, although not exactly in proportion to it. The following table shows approximately the amounts for different periods of life:

AMOUNT OF URINE PASSED DAILY.

Birth to 2 years	8 to 12 ounces.
2 to 5 years	15 to 25 "
5 to 10 years	25 to 35 "
10 to 15 years	35 to 40 "
Adult life	52 "

Every mother should be acquainted with the normal *temperature* of a baby, in order that she may be able to appreciate the changes occurring in disease. There is no way of determining this except by the clinical thermometer, for it is impossible for her even to approximate it satisfactorily by simply placing her hand upon the skin. Even the fact that a baby's hands and feet are cold is not sufficient proof that it is not having high fever at the same time. A clinical thermometer should be in every household, and the mother should thoroughly understand its use and should employ it whenever the child seems at all ailing. She should understand, however, that the taking of her infant's temperature every few hours, on her own responsibilty, and just to see whether it is any lower, is not only most annoying to the patient, but is an entirely useless proceeding. She should equally understand that the degree of fever which the thermometer may show is for the physician's information, not for her own ; and that it must not be a cause of needless anxiety. Taken alone, fever in a baby, even when high, indicates very little, and does not necessarily mean that there is

the slightest danger existing (see page 246). Unless a mother can use a thermometer with this judgment and coolness she had better let it alone. The instrument commonly used is self-registering; that is, the top of the column of mercury, which indicates the temperature attained, will remain at the highest point reached, even after the thermometer is removed from the child. The instrument is generally entirely of glass, without any outside casing, and the Fahrenheit scale is engraved upon the tube, dividing it into degrees and fifths of a degree (Fig. 6). The arrow on the tube merely points to what

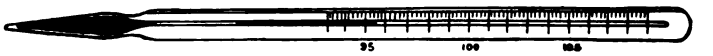

FIG. 6.—Clinical thermometer.

is considered normal—that is, $98\frac{3}{5}°$. It may be disregarded altogether in making the reading. The pattern now oftenest used is called a "one-minute thermometer." This is to be preferred to the older three-minute form. Yet it would be a mistake to depend on the full elevation being attained in just one minute. A somewhat longer time is usually required. Most of the instruments have the stem so shaped that the front acts like a lens and magnifies the column of mercury, in order to make the reading more easy.

The temperature may be taken in the arm-pit, mouth, or bowel. The groin does not give sufficiently accurate results. The first locality should ordinarily not be chosen for children, as the results obtained are often very misleading, owing to the difficulty experienced in bringing and keeping the surfaces of skin close together and thus excluding the air. The thermometer may be placed in the mouth of children of five or six years, who can be trusted not to bite upon it. To employ it the child

should be seated or, still safer, made to lie down. The instrument should now be held firmly by its upper portion between the thumb and forefinger, and be swung or shaken forcibly until the column of mercury is made to descend in the tube far enough to bring its upper extremity to 95° or thereabouts. The child now receives the bulb under the tongue, and is told to close the lips upon it, but not to bite it. Very often the order will be understood better if the child is bidden to hold the instrument with one hand and to suck it "like a stick of candy"—that being an action with which every child seems familiar.

With younger children or those who, through sickness, cannot be entrusted with the thermometer in the mouth, the temperature is more conveniently taken in the bowel. To do this the child is laid upon its back or side in the lap or on the bed and its thighs are flexed. The bulb, previously oiled, is then gently inserted an inch or two by a screwing movement. The procedure is simple, painless, and free from danger. Although it is better to be sure that there are no fecal contents in the rectum, it is not necessary to remove them by injection, provided the thermometer be left in place somewhat longer. If no feces are present, the time mentioned for the mouth is sufficient. The thermometer should always be washed thoroughly with soap and *cold* water after use, disinfected with a boric-acid solution (Appendix, 79), shaken down well, and placed in its case.

The normal temperature of a baby fluctuates considerably during the first week or more of life, and is normally at this period about 99° F. Later it settles down to from 98° to 99° F., as in the adult. We must remember, however, that children are liable to have their temperature elevated, sometimes decidedly, by slight causes,

such as hard crying or struggling against the use of the instrument, or even by the taking of a large amount of nourishment, although these variations are not so apt to occur as in the case of the respiration and the pulse. There is, besides this, a regular variation during the twenty-four hours, which is present in adults also, but is less marked. The normal temperature rises slightly in the forenoon, reaches its highest point in the afternoon, begins to sink again in the evening, and is at its lowest by midnight or in the early morning hours. There may thus be a difference of one, two, or even three degrees between the readings at different times of the day. It is important to bear all this in mind, or we might become very unnecessarily worried. In spite of the quite considerable variations during the day in early infancy, we need feel no uneasiness until the temperature falls to 97° or 96°, or rises to 100° or more. It is only when a temperature of 100° is attained that we talk of *fever*. The signification of febrile temperatures in children we shall consider when we study the Sick Baby, in Chapter XI.

Most of what has been said in this chapter relates to the baby while still very young. All the features described alter gradually with the increasing age of the child. The subject of the growth of the baby with the interesting changes which take place is so important that it must be considered in a chapter of its own, although a few of the progressive alterations, including those in pulse, respiration, temperature, urine, and bowel-movements, have been more conveniently discussed in this chapter.

CHAPTER III.

THE BABY'S GROWTH.

FORTUNATELY, the baby grows; for, charming as is its early helplessness, how much more delightful to watch the development of its beauty, strength, and intelligence! What mother will forget her happiness at the baby's first tooth, its first step, and its first word!

But all this progress comes only gradually; it is bit by bit that the child grows. By *growth* here is not meant increase in size and weight alone, important as these are. The baby's mind steadily grows, and the changes in it are even more remarkable than those of the body. The watching of this mental development is most interesting if we really appreciate just what the baby knows and just what it ought to know at different periods of life.

Besides all this growth of what is already present to some extent, new acquisitions appear, such as the teeth, tears, saliva, and the ability to walk; and still other changes go on which are not actually visible, such as alterations in the digestive powers.

When the baby is just born, and during the first few days of life, it is, as stated in the preceding chapter, very little more intelligent than a vegetable. Its soul and its intellect are there, but they are dormant, waiting to be awakened. It has also little control over its body, and all its movements are automatic or instinctive. Probably there is not a single expression of the face or motion of the arms or legs which represents a distinctly willed action. Supported in the arms, the child cannot hold its head upright, but lets it roll from side to side as though in danger of snapping it off. The child lies just as it is placed in bed, unable to change its position. A new-born baby probably cannot see except to dis-

tinguish light from darkness, and will not wink when the finger is brought close to its eyes. It seems also unable to hear, and its sense of smell is but slight, although taste is well developed. It is, in fact, not directly conscious of anything. When it nurses at the breast it does not know it is nursing, and when it cries it is ignorant of any sensation that makes it cry. Later, when it moves its arms and legs strongly during nursing, or when it throws its head back or lifts its hand in response to a forcible touching of its nose, or when it takes hold of anything placed in its palm, it is not because it *wishes* to express eagerness for anything to eat, or to move its head out of the way or to close its fingers, but simply because it cannot help it.

It is not long, however, before an interesting change begins. There is seen a distinct increase in the power of control over the members. By the time the baby is three months old, or sometimes a little before this, it gradually begins to make efforts at grasping after objects, although totally unable to judge whether they are near or far away, and by six months it can make many well-directed movements and will play with toys. Before the age of two months the baby has evidently gained considerable power in lifting its head, and by that of three or four months it can hold it without support very well. It usually does not attempt to maintain a sitting position until it is between three and four months old, and does not succeed in doing so unsupported until at least six months old. Even then it is not very steady, and is easily upset until the age of nine or ten months.

At about six months the baby will sometimes make an effort to stand, if held upright on its feet in the mother's lap, and will try to put one foot in front of the other. At seven or eight months it begins to creep on hands and knees, and by nine or ten months of age is

often able to stand with support, and frequently to walk some steps by holding to the furniture or to some one's hand. By the age of one year strong children can walk a little without help.

There is no absolute rule, however, for the time or for the exact order of learning to creep and to walk. Many children are very slow in walking, particularly if they have become expert and rapid crawlers, while some do not creep at all, but learn first to stand and then to walk. Some creep only on the hands and feet, never using the knees; others never creep, but progress over the floor with a peculiar pushing movement while in a sitting position. A mother should be in no hurry about the walking. Fifteen to eighteen months is really quite early enough, and some children do not learn until two years of age, and yet are perfectly healthy. Nevertheless, as great a delay as this latter cannot but lead to the suspicion that something is wrong with the child's development.

It is a curious observation that when babies fall during their early efforts at walking they nearly always go backward into a sitting position. This is due to the fact that the muscles of the front of the leg have not yet become as strong as those of the back. Every child also naturally walks "pigeon-toed," and the learning to turn the toes out is always a slow matter.

With the increasing power and control of motion there is a development of the senses also. By the age of six weeks or earlier the baby can fix its eyes upon objects near it, and will quickly shut them if something is moved rapidly toward them, and by the age of two months its vision is nearly perfect, although colors probably cannot be distinguished at all until the age of a year, and the color-sense even after this increases slowly in many children. However, although able to see, the

infant cannot well manage the motions of its eyes at this period, and there is a great tendency for it to look cross-eyed. Hearing and the sense of smell develop rapidly, and within the first week the baby will be awakened by loud or shrill noises. It does not begin, however, to notice the character and the direction of sounds until it is three months old. Musical tones are sometimes recognized between the ages of one and two years, or very occasionally earlier than this, and a child of two or even less may distinctly prefer one tune to another, and perhaps know it by name. In other instances, however, the power to recognize a tune does not come until later childhood, and sometimes never. Things are made up to the baby later in life, for a child of ten years both sees and hears better than an adult.

It would be interesting to know what a baby's sensations are in its early months of life, but we can discover this only to a limited degree. It probably feels pretty comfortable, on the whole, and when uncomfortable it cries. It experiences hunger and the inclination to sleep. By the time it is a month old it often shows its pleasure by smiling, but it generally does not really laugh until five or six months of age, or even older. Smiles before the age of one month are usually not indicative of pleasure, but belong to the class of automatic and similar movements referred to.

The child clearly begins to have more intelligence, and the pleasure that accompanies this, when it is three months old, and by this time shows distinct evidence of having a mind and of exercising some thought. By this age or a little later it learns to recognize its mother and to be pleased at her approach, and if hungry will cease crying when it sees her preparing to nurse it. It also enjoys bright objects, especially if they are moving before it. Even before the age of three months, however, it seems to

appreciate in some way the difference in the handling of it by different persons, and is soothed by some and not by others. Often, too, crying may be checked by taking the child up, or brought on by laying it down, showing that it is cognizant in some way of what is done to it, and has some desires in the matter. Between three and four months of age the baby begins to look about it more, to feel the pleasure of grasping after objects, and to show fear and wonder. When it is four or five months old it learns to recognize other friends and to smile and move its arms at them. When nine months old it will give its hand when requested, and will thoroughly enjoy a game of "peep-bo." By the completion of its first year it has learned to show distinctly, by expressions of face and by gestures, its likes and dislikes for the persons and acts of others. Between the age of one and two years the baby shows some idea of number.

All sounds made early in life are impulsive only. Although the child at one or two months of age begins to use its voice in making peculiar cooing noises expressive of comfort and happiness, it does not, of course, *will* to utter these particular sounds rather than others. About the age of six months the baby commences to make different vowel sounds, especially that of *ah*, and a little later it learns to prefix these with such consonants as *m*, *b*, *d*, *p*, *n*, and *j*, these being the easiest ones to pronounce. The mother often now firmly believes that the baby means herself when it makes the sound of *ma-ma*, but this is not the case. The child is only expressing some pleasurable emotion in this way.

But with growing mental power the distinct imitation of sounds soon comes. By the age of eight or ten months the child utters several syllables intelligently, and when it is a year old it can say "papa" and "mamma," and maybe some other words, and really means what it says.

Very often it acquires the understanding of certain words before it learns to speak even in syllables. At eighteen months of age it can express many of its desires by the use of a few words aided by gestures, and by two years it can speak in short sentences, although its vocabulary is, of course, very limited.

We can, perhaps, best consider here the growth of control over some of the functions of the body—namely, the movements of the bowels and the passage of urine. A great deal will depend upon the training, but all children should gain complete control by the age of two years as an extreme limit, and most of them acquire it long before this, and need a diaper only during the night, if at all. Some who have been carefully taught have gained almost complete control during the day time when little more than three months of age.

We have yet to study the baby's growth in bodily proportions. There have been very many estimates made of the average height and weight of children at different ages, and there has even been constructed an elaborate algebraic formula for calculating what these should be. The truth of the matter is that the variation is too considerable to allow of any iron-bound statements regarding it. The table here given (page 53) is an approximation of the length and weight which children should exhibit from birth up to sixteen years of age.

Looking closely at the table, we notice several interesting facts. We see that the baby usually loses weight during the first week and often longer, but that by the end of two weeks it weighs somewhat more than at birth. The loss of weight is greater than the table shows, for by the age of one week the baby has regained most of the loss. As a rule, a child loses in the first three or four days about one-fifteenth of its initial weight. To

this rule there are many exceptions, since children sometimes grow steadily heavier from the beginning.

TABLE SHOWING GROWTH IN HEIGHT AND WEIGHT.

AGE.	HEIGHT.	WEIGHT.	
Birth	19 in.	7 lbs. 8 oz.	
1 week		7 " 7½ "	
2 weeks		7 " 10½ "	Gained 1 oz. a day; 7 oz. a week.
3 "		8 " 2 "	
1 month	20½ in.	8¾ "	
2 months	21 "	10¾ "	
3 "	22 "	12¼ "	Gained ¾ oz. a day; 5½ oz. a week.
4 "	23 "	13¾ "	
5 "	23½ "	15 "	Double original weight.
6 "	24 "	16¼ "	Gained ⅔ oz. a day; 4⅔ oz. a week.
7 "	24½ "	17¼ "	
8 "	25 "	18¼ "	Gained ½ inch a month.
9 "	25½ "	18¾ "	
10 "	26 "	19¾ "	Gained about 1 lb. a month.
11 "	26½ "	20½ "	
1 year	27 "	21½ "	Treble original weight.
2 years	31 "	27 "	Gained 4 inches a year.
3 "	35 "	32 "	
4 "	37½ "	36 "	Double original length.
5 "	40 "	40 "	Gained 3 inches and 4 lbs. a year.
6 "	43 "	44 "	Gained 2 inches and 4 lbs. a year.
7 "	45 "	48 "	
8 "	47 "	53 "	Gained 2 inches and 5 lbs. a year.
9 "	49 "	58 "	
10 "	51 "	64 "	Gained 2 inches and 6 lbs. a year.
11 "	53 "	70 "	
12 "	55 "	79 "	Gained 2 inches and about 9 lbs. a year.
13 "	57 "	88 "	
14 "	59 "	100 "	
15 "	61 "	109 "	
16 "	63 "	117 "	

During the last three weeks of the first month the baby gains about one ounce a day; in the second month about

one ounce a day; and in the third and fourth months about five and one-half ounces a week; that is, about three-quarters of an ounce a day. By the time it is five months old it has doubled its original weight. In the fifth and sixth months it increases two-thirds of an ounce a day, and after this, from seven to twelve months, it gains at the rate of about one pound a month—that is, three and two-thirds ounces a week, or a trifle over half an ounce a day—except in the ninth, and again in the eleventh month, when the increase in weight often lessens somewhat. At the age of a year the baby has trebled its original weight.

As to length, we are struck by the fact that from the age of two to that of four months the increase is one inch a month, and after this, up to one year, it is half an inch a month.

After the first year we notice that, taking it all together, there is a gradual increase in the number of pounds and a decrease in the number of inches added yearly, four inches being gained in both the second and third years, three inches in the fourth and fifth years, and after this two inches a year. The gain in weight is four pounds yearly from the age of three to that of seven years, then five, then six, and then about nine pounds. It sometimes happens that at about the age of nine in girls and eleven in boys there is almost a cessation of growth for a short time. Later, at about twelve years, girls take on a particularly rapid growth, and decidedly exceed boys of the same age in weight, and sometimes in height also. At fifteen or sixteen years the rapidity of growth in girls, both in weight and height, will be greatly diminished, while boys of this age will often begin to develop very rapidly, and will soon materially exceed the other sex in both respects. These times for the retardation and acceleration of growth vary greatly, how-

ever, in different children. No fixed rule can be formulated.

The weights and measurements in the table apply fairly well to children of both sexes, although it is a fact that boys at birth are apt to be somewhat larger and heavier than girls, and to continue so until the neighborhood of twelve years. In fact, all the figures in the table are, of course, only average ones, and a child may measure or weigh somewhat less without there being any occasion for anxiety if it is perfectly healthy; while it may decidedly exceed the figures without being phenomenal. This is especially true of children who have passed the age of three or four years. We all know how great the variations in size are in early and later childhood. When, however, it is an infant which is materially behind in its height or weight, the mother should at least have her suspicion aroused that something is wrong. A useful and convenient plan of recording the weight during the first two years is upon a "Weight Chart," such as the sample copy opposite. This is rather more accurate than the table. The figures at the top and bottom give the weeks and months of the age; those at the sides the pounds and ounces; each horizontal line representing four ounces. The line running diagonally across the chart represents the normal weight of an average breast-fed baby. In using the chart the baby should be weighed weekly, a dot with ink made on or between the horizontal lines to correspond with the weight obtained, and these dots as made joined by an ink line.

This weekly weighing of the baby is exceedingly important in order to be sure that growth is going on properly. But to obtain results at all accurate, it is very im-

portant that the baby be weighed without clothes, or, better still, that it be weighed when dressed, and that the weight of the clothes or of a similar suit be ascertained afterward and the amount deducted. It will not, of course, be necessary to weigh the clothes separately on every occasion if we are careful that they are always of the same sort. Systematic weighing is particularly important when some change in diet is being made, for

FIG. 7.—The "Favorite" family scales.

we can determine in this way whether the food is sufficiently nourishing in quality or great enough in quantity. Either accurate spring scales or steelyards serve fairly well to do the weighing. A very convenient form, called the "Favorite"[1] baby scales, consists of a strong standing spring scales with a basket firmly attached. Another less expensive scales of the same general form, and made by the same firm, are shown in the

[1] The "Favorite baby scales" retail at about $5.00, and the "Favorite family scales" at $2.00. Both are made by John Chatillon & Sons, New York.

illustration (Fig. 7). A scoop takes the place of the basket. With these spring scales the results are by no means so accurate as with balance scales in which weights are used (Fig. 8[1]). With either form the scoop may be removed, if found too small as the baby grows, and a flat board attached in place of it, balancing this properly to allow for the difference in weight. Whatever apparatus is employed must show variations in weight down

FIG. 8.—"Counter" scales.

to one ounce. Those having markings of only a quarter of a pound or more are useless for our purpose. In using the steelyard the child is pinned securely in a towel or opened diaper, and this then hung on the hook. In weighing children of five years and older the clothes may be assumed roughly to be one-twelfth of the total weight of the child when dressed.

To measure the length, the baby may be held against the wall with its heels resting upon the floor, and the

[1] These "Counter scales" are made by E. and T. Fairbanks & Co., and retail at between $7.00 and $8.00.

Fig. 9.—Apparatus for measuring an infant's

height be marked above it. A much more convenient and correct method is to have a carpenter construct an apparatus like an enlarged foot-measure of the kind employed by shoemakers. This is used when the child is lying on a firm bed, the end-piece being placed above its head and the sliding one moved along until the feet (both toes and heels) rest upon it. The apparatus shown in the illustration (Fig. 9) is forty-six inches long, and the upright pieces are eight inches in length and are lined with felt.

As the baby grows, not only is there an increase in the total weight and height, but the relative value which the dimensions of the various parts of the body bear to each other also changes, since one part grows more rapidly than another. This is well shown by the accompanying illustration, taken from an article by Dr. L. M. Yale[1] (Fig. 10). The six figures represent the ages of one, five, nine, thirteen, seventeen, and twenty-two years; that is, they are separated by periods of four years each. Each figure is divided into four equal parts, marked by the crossing of the dotted lines. The lines are curved, simply because the child grows more and more slowly. If its length kept increasing at the same rate all the time, it is obvious that the lines would be straight. If we look again at the diagram, we see that the head of the child of one year measures one-fourth of its total

[1] *Babyhood*, vol. ii. p. 311.

length, while the trunk is not much more than this, and the legs do not measure more than one and one-half fourths (three-eighths). As the author says, the child

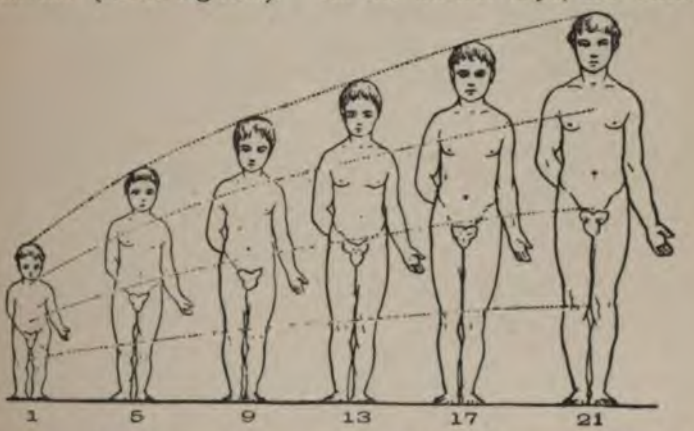

FIG. 10.—Diagram showing proportionate growth of different parts of the body at various ages from 1 to 21 years.

is "four heads high." In the adult of twenty-one years we see that the head is proportionately much smaller, measuring only two-thirteenths or less of the whole length, while the legs have grown much more rapidly and now equal one-half of the total length. The trunk has not kept pace with the legs, for in the baby the middle of the body, as shown by the dotted line, is the navel, while in the adult it is decidedly lower. All this rapid growth of the legs is generally accomplished after the age of nine years, as the diagram shows. It is well known how rapidly boys and girls shoot up after this period, and how out of all proportion their apparently long legs seem. The legs are, in fact, really no longer than they ought to be, but we have grown so accustomed to the short legs of earlier years that the change does not seem natural.

At the age of thirteen or fourteen years, the time of puberty, a decided change takes place in girls, the figure beginning to assume that of womanhood, and the menstrual discharge appearing; while at about the same time or a little later boys experience a change of voice.

Besides the growth in height and weight, there is, of course, increase in girth as well. The matter of most importance here is the circumference of the head and that of the chest. We should know what these ought to be at different ages, for the proper increase of girth of chest is an indication of proper development, and variations from the normal size of the head may indicate disease. It is important, however, to remember that the heads of different babies vary much in shape and size within normal limits. The chest-measure should be taken just above the nipples, and that of the head at a little above the level of the eyebrows. The following table shows approximately the circumferences of the chest and of the head at different periods of life:

TABLE SHOWING CIRCUMFERENCES OF HEAD AND CHEST AT DIFFERENT AGES.

	HEAD.	CHEST.
Birth	13½ inches.	13 inches.
6 months	17 "	16½ "
1 year	18¼ "	18 "
2 years	19 "	18½ "
3 "	19½ "	20 "
5 "	21 "	22 "
Adult life	21½ "	30+ "

It is interesting to observe from this table how much more rapidly the chest grows than the head.

In this connection we must not forget the condition of the anterior fontanelle. This opening grows no smaller, and even increases in size up to the age of nine months.

After this it grows steadily smaller by the growth of bone over it, and should be entirely closed in healthy children by the age of seventeen or eighteen months.

Finally, we must consider some of the new acquisitions of the child in the line of development. Among these is the ability to shed tears, which has already been referred to. A new-born baby can cry and its eyes become moist, but it is generally not until the age of three or four months that tears actually run down its face.

Another acquirement is the new head of hair which follows the first one. At about the end of the first week the first hair often begins to fall out, and continues to do so for one or two weeks. A considerable amount of it also is worn away from the back of the head by friction upon the pillow. The new hair begins to grow in only very slowly, and is of the same soft, silky texture as the first, but lighter in color than it was, or than the hair will be in adult life. Indeed, throughout the child's life, leaving the first hair out of account, there is a tendency for the color to grow constantly darker. The speed with which the hair grows in is very variable. One may sometimes see a child of five months with its head actually shaggy, but as a rule it is very thinly covered at this age and for months after it. Sometimes children are born with remarkably shaggy heads of hair and do not suffer this early loss of it.

Then, too, the baby acquires increased powers of digestion not possessed before. Saliva is one of the secretions of value in the digestion of starch. In early life it is only sufficient in amount to keep the mouth moist, but at the age of three or four months it has increased so greatly that the baby begins to dribble and must have its clothing protected by a bib. Many people suppose that this dribbling is a sign of irritation produced by the cut-

ting of teeth, but, although it usually accompanies teething, it is really only the evidence of the acquisition by the child of the new secretion. Indeed, there is no excessive production of saliva at the time the teeth which one would suppose were the hardest to cut—namely, the molars—come through the gums. There is certainly no intimate connection between healthy dentition and the flow of saliva.

So, too, the secretion of the stomach, generally called the gastric juice, is poorly developed in young babies, and the digestive strength of the juices of the pancreas and of the intestine is also very weak ; but all these increase with advancing age. On the other hand, the movements of the stomach are remarkably active in babies, and we consequently often see regurgitation of food occurring daily.

Finally, we have the acquisition which is the cause of the greatest excitement and pleasure to the family at first, and often of much worry later—the teeth. At the very outset we must bear in mind that teething is a normal process and not a disease. We are making a woful mistake if we attribute to teething disturbances of the baby which are caused by some real ailment. Many and many a mother has allowed a child to suffer, and even to die, because she has supposed that the evident distress was the result of an advancing tooth. It is one of the commonest things in the world for a tooth to be cut without anyone knowing that anything is happening. It is never right for a mother to take it for granted that the teeth are the source of fretfulness, but a thorough search must be made for some more remote cause. Physicians seldom practise gum-lancing nowadays, as compared with the frequency of a few years ago. There is, however, such a thing as disordered dentition, but this can be better considered among the diseases of infancy.

A baby at birth possesses smooth, firm gums, of a light-pink color, with quite narrow and rather sharp and hard edges. After some months, as the teeth begin to approach the surface, the edges of the gums grow broader on the anterior aspect and somewhat more prominent, but do not become red or inflamed in ordinary healthy teething. This condition may continue for a month or more before any teeth are cut. The teeth have a definite order of appearing; and yet this is subject to very great variation, and writers differ somewhat as to just what the normal order is. There are twenty milk teeth—*temporary* or *deciduous* teeth, as they are also called—and their eruption constitutes the first dentition. They consist, in each jaw, of two central incisors, two lateral incisors, two canines, two anterior molars, and two posterior molars. Their arrangement may be seen in the diagram (Fig. 11). The canine teeth of the upper jaw are commonly called the *eye* teeth, and those of the lower jaw the *stomach* teeth.

FIG. 11.—Diagram showing the temporary teeth: *a*, central incisors; *b*, lateral incisors; *c*, canines; *d*, anterior molars; *e*, posterior molars.

The *permanent* teeth, or the teeth of the second dentition, number thirty-two. They begin to appear about the sixth year of life, and consist of four incisors, two canines, four bicuspids, and six molars in each jaw (Fig. 12). In this dentition the incisors and canines replace those of the first dentition, the bicuspids take the place of the temporary molars, and the permanent molars appear where there were no teeth at all before.

The teeth are cut in distinct groups, with a pause between the eruption of each group. The first group of the

milk teeth to appear usually consists of the lower central incisors, which come through the gum at about the age of seven months, although often earlier than this. Then occurs a pause of three to eight weeks, followed by the appearance of the second group, consisting of the four upper incisors, between the age of eight and ten months. The central upper incisors generally appear first, followed closely by the lateral upper incisors. A second pause now occurs, lasting from one to three months, followed by the eruption of the third

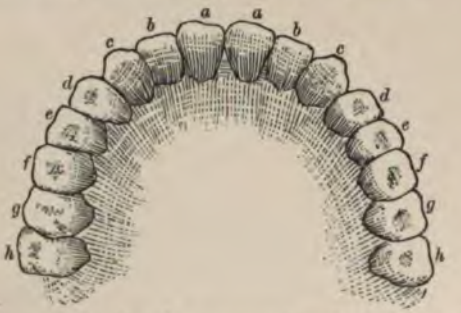

FIG. 12.—Diagram showing the permanent teeth: *a*, central incisors; *b*, lateral incisors; *c*, canines; *d*, first bicuspids; *e*, second bicuspids; *f*, first molars; *g*, second molars; *h*, third molars.

group of teeth—namely, the four anterior molars and the two lower lateral incisors—which appear at the age of from twelve to fifteen months. The teeth of the third group are not all cut at once or in any invariable order, although the anterior molars in the upper jaw often come first, and are followed by the incisors and then by the molars of the lower jaw. After the third group there comes a pause of two or three months, no more teeth appearing until the age of eighteen months, at which time, or between the ages of eighteen and twenty-four months, the fourth group, the canines, are cut. Finally, after

another pause of two to four months, the fifth group, the posterior molars, appear, between the twentieth and thirtieth months of life. Thus it will be seen that a baby a year old should have at least six teeth, and possibly twelve, if the third group is cut promptly, and that by the time it is two or two and one-half years of age all the temporary teeth should be through. The following tabular arrangement shows at a glance the order and time of the eruption of the temporary teeth:

ERUPTION OF MILK TEETH.

First group . .	Two lower central incisors. . .	7 months.
	Pause . . . . 3 to 8 weeks.	
Second group . .	Four upper incisors	8 to 10 "
	Pause . . . . 1 to 3 months.	
Third group . .	Four anterior molars and two lower lateral incisors	12 to 15 "
	Pause . . . . 2 to 3 months.	
Fourth group . .	Four canines	18 to 24 "
	Pause . . . . 2 to 4 months.	
Fifth group . .	Four posterior molars	20 to 30 "

As has already been stated, a great deal of variation is seen both in the order and in the time of the cutting of the milk teeth, and the mother need not think it strange if the two lower central incisors are not the first to appear. So, too, a healthy baby may cut its first tooth at decidedly less than four months of age, or may even be born with an incisor tooth; or, on the other hand, may still be toothless at the age of eight or nine months. Instances of children born with teeth are uncommon. Such a tooth generally soon falls out and is replaced at the proper age by a regular milk tooth. Sometimes, however, it remains until supplanted by one of the second dentition. It is at times necessary to remove these premature teeth, but the decision upon this point will naturally be left to the child's physician.

Too great a delay in the beginning of dentition is a sign of ill-health, and a baby who has no teeth by the age of a year cannot be considered to be in a healthy state, however plump and well nourished it may be. Just what ails it we shall consider in the chapter treating of the Sick Baby.

The milk teeth stay in position for several years. Then, as the permanent teeth push forward in the jaw beneath them, their roots become partially or entirely absorbed, and the teeth themselves loosen and fall out, or are pushed out by the advancing permanent teeth, in much the same order as that in which they came in. Very often they do not fall out as soon as they should, and, as a result, the incoming second teeth are crowded out of position, and a very ugly displacement is finally produced, which is wholly the result of negligence on the part of the mother. A child should be taken to the dentist at regular intervals, whether or not the teeth are decayed, in order that no such disfigurement may arise; for it is much easier to prevent it than it is to correct it when once present. The narrowness of the jaw in a child is another reason why the permanent teeth, particularly the canines, are so often displaced forward and outward, and this fact renders the advice of a dentist still more important.

The earliest of the permanent set to appear are the first anterior molars, often called the "six-year-old teeth," which come in immediately adjoining and to the outside of the temporary second molars. A mother should be on the watch for these teeth, for, as they do not replace any of the teeth already present, they are apt to be cut, and even to decay, without her being aware of it. The remaining permanent teeth are cut in much the same order as the milk teeth. The order and the date of appearing are shown in the following table :

ERUPTION OF PERMANENT TEETH.

Four first molars	6 years.
Four central incisors	7 "
Four lateral incisors	8 "
Four first bicuspids	9 to 10 "
Four second bicuspids	10 to 11 "
Four canines	11 to 13 "
Four second molars	12 to 15 "
Four third molars	17 to 25 "

The teeth of the lower jaw are cut somewhat before the corresponding ones of the upper jaw, the intervals being, perhaps, as great as several months. The time of the eruption of the permanent teeth varies considerably within certain limits. The third molars are popularly termed the "wisdom teeth." Their eruption is frequently delayed until considerably after the age of twenty-five years.

The alterations in pulse and respiration and in the frequency of the bowel-movements and of the passage of urine which take place with increasing age, as well as some of the minor changes of the first few weeks, have already been referred to at length in the preceding chapter. This was done as a matter of convenience merely, for the changes are connected closely with the baby's growth, and belong properly to the subject of the present chapter.

Finally, let no mother conclude offhand that the statistics which have been given are incorrect because they do not accord with her experience in the case of her own children. They are average only, and are the result of much and careful study by different observers. Of course, some children are much ahead of the average, and others behind it, yet they are nevertheless neither remarkable nor unhealthy.

CHAPTER IV.

THE BABY'S TOILET.

ALL this time, although we have been watching the baby grow, we have not seen it either bathed or dressed. In preparation for the first and for subsequent toilets it is customary, before the baby's birth, to get ready that most

FIG. 13—Baby's basket.

convenient article commonly known as *the baby's basket*. A large selection of baskets may be found in the shops, fitted in different ways to suit the varying fancies and means of mothers. In choosing one it is to be remembered that too elaborate a basket is more ornamental than useful. A serviceable form is a stand of

wicker, the lower part of which consists of one or more shelves or of a closed basket where articles of clothing not immediately needed can be kept; while the upper portion, or baby's basket proper, consists of an oval or oblong, rather shallow receptacle which may or may not be provided with a lid (Fig. 13). It is important that the stand be low, as otherwise the articles contained can-

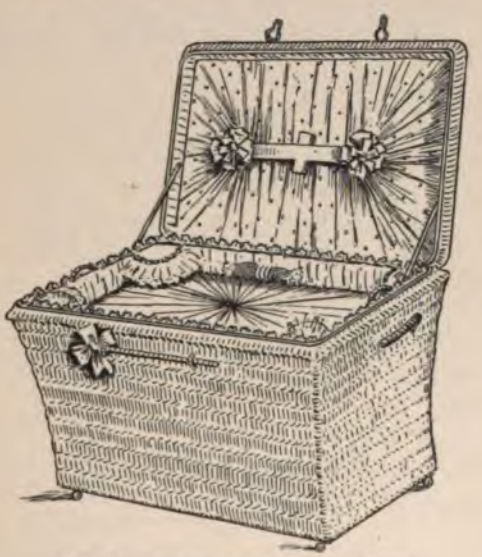

FIG. 14.—Baby's basket, hamper form.

not well be reached from the chair used when making the child's toilet. The chair is also low in order that it may make the nurse's knees high enough to form a good lap. The basket should possess several pockets around the inside, to hold the smaller articles. It should also have one or two pin-cushions fastened within it. The interior may be lined with silk or cambric, according to taste, and the basket draped with lace or Swiss muslin.

A simpler and very popular kind of basket, more easily

moved about, is one of the hamper form with a hinged lid. This is, of course, not provided with a stand. The lower part of the hamper contains clothing, while a tray above this holds the various articles for immediate use (Fig. 14).

The baby's basket should contain the following articles:

Salicylated cotton for dressing the cord.
Plain absorbent cotton for washing the mouth and eyes.
Blunt-pointed scissors.
Safety-pins of assorted sizes.
A soft baby's-hair-brush.
A small, fine comb.
A powder-box containing powder and puff.
Soap in a metal or celluloid soap-box.
A fine, soft sponge and a soft wash-rag.
Vaselin in a jar or tube.
An old soft blanket in which to receive the child after birth.
A couple of soft towels.
A woollen shawl or shoulder-blanket.
A complete suit of clothes.

The choice of the soap, powder, hair-brush, etc. will be considered presently, and the nature of the clothes will be discussed in the next chapter.

The first washing of the baby is the business of the monthly nurse, and the mother has no share in it. Still, it is well for her to understand how it should be done, if only as a matter of interest. We must remember that the new-born baby is a very tender object, exceedingly susceptible to the influence of cold, and with a very delicate skin. Indeed, in the case of children weakly at birth the physician often forbids any washing whatever

until the vitality has increased. In giving a bath it is consequently necessary to guard most carefully against draughts. The doors and windows must be closed, and the child should be protected still further by placing a folding screen around the nurse's chair and the tub, and by doing the bathing before a fire unless the weather be very hot.

The washing and drying should be done thoroughly, rapidly, and yet with the greatest gentleness. The nurse seats herself in her low chair beside the tub, with the baby's basket and the vessels of hot and cold water conveniently at hand. She should protect herself with a rubber apron, over which is a second bath-apron of warmed soft flannel on which the baby lies. A very convenient form which has been recommended consists of two long and broad pieces of flannel or other soft material sewed or, better, buttoned to the same waistband. The lower one of these may be used to hold the baby in, and the upper one to cover it after its daily bath and while it is being dried with the towels ; or the upper one may hold the baby while being dried, after which it may be unbuttoned and cast aside, and the lower, dry apron may be used to hold the child while being dressed. At the first washing the old blanket contained in the baby's basket should be used to wrap the child in immediately after birth and until it has been oiled, soaped, and dipped.

The new-born baby is more or less covered with a whitish, waxy substance which must be removed entirely, especially from all folds and hollows of the body, such as the armpits, hollows of the knees, groins, and ears, as otherwise irritation of the skin is apt to be set up. As the cleansing is not easily accomplished by ordinary washing, it is necessary first to rub the skin all over with olive oil or with purified white vaseline. This

is much better than lard unless the latter has been carefully freed from salt by washing. The baby should now be laid on its back and be enveloped in the old blanket, and should then have its face carefully washed with warm water and a very soft sponge or wash-rag, but without soap. The eyes must receive particular attention. The lids should be separated by the fingers and gently and thoroughly freed from all secretions by squeezing a little warm water between them and very gently rubbing them with a little moistened absorbent cotton. This care is needed, because in the process of birth irritating substances often enter the eyes and set up a severe inflammation which may even terminate in loss of sight. Sometimes the physician in charge himself washes the eyes, or orders them to be washed, with some strong antiseptic solution if he deems it necessary, but such solutions should never be used without his orders.

The mouth must now be cleansed very carefully with a little absorbent cotton wrapped around the nurse's finger. Indeed, it is often necessary to wash the mouth instantly after birth if much mucus or other material has been forced into it.

The bath may now be prepared, the water being at a temperature of 100° F. as shown by the thermometer, not as guessed at by the nurse. The whole body except the face, which has already been washed, is now rubbed with soap and water. The soap is best applied with a wash-cloth, which adapts itself to the folds and creases rather better than a sponge does. The baby is then placed in its tub and entirely submerged except the head. It may be kept in the bath for a minute or two if it seems to enjoy it. While there its head and back are supported by the nurse's left arm and wrist, her hand grasping its left shoulder, and thus keeping it from

slipping down into the water. When the bath is over the child is lifted into the nurse's flannel apron, the right hand supporting the legs and the lower part of the trunk. It is covered well, and made to lie first on its back and then on its stomach while it is *patted* thoroughly dry with the softest towels. As a finishing touch a little powder is dusted about the folds and hollows of the body and the baby is then ready to be dressed.

Succeeding baths are much like this first one, with the exception of the oiling, and with the important exception, too, that until the cord falls, sponging in the nurse's lap replaces tubbing. This is done in order that the dressing of the cord may remain dry and undisturbed.

There are certain modifications in the bath, however, which depend upon the age of the child, and these, with some details regarding other matters connected with the toilet, must be considered a little more particularly.

The nature of the baby's bath-tub is of some importance. For the first bath a painted tin foot-tub, or even

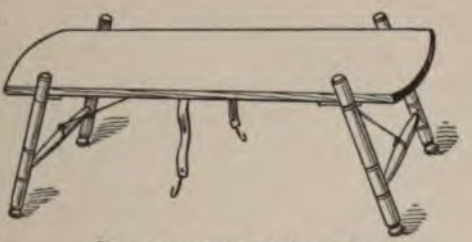

FIG. 15.—Folding bath-stand.

a large basin, will answer, but it is well to be provided in advance with a tub especially designed for a baby's use. There are many varieties of these. A serviceable one for constant employment is of tin, porcelain, or agate iron, oval in shape, and with a sloping back. A blanket may be put into the tub before it is

filled with water, in order to make the surface softer for the baby's body. Wooden and *papier-maché* tubs are difficult to keep clean. As leaning over such a tub while giving the bath is a very back-breaking procedure, it is desirable to place it upon a low stand, eighteen or more inches high, made for the purpose. Stands of this sort may be bought in the shops. They are either of permanent form or of such a nature that they can be folded up and put away when not in use (Fig. 15).

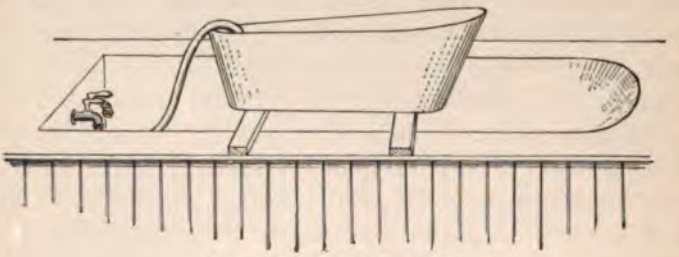

FIG. 16.—Bath-tub on slats.

A very convenient device has been described, intended to obviate stooping and to render the filling and emptying of the tub easier (Fig. 16). A couple of strong slats several inches wide, with cleats on the under surface to prevent slipping, are placed across the ordinary stationary bath-tub when needed. Upon these the baby's bath-tub rests, and may be filled by means of a rubber hose screwed to the faucets. It is a good plan to attach the tub to the slats by straps when in use, in order to prevent the possibility of pushing it off.

A still more convenient tub made of rubber can be bought. It is of a folding pattern, which does away entirely with the stand. It occupies very little space when not in use, and is especially serviceable to take to summer resorts or when visiting. An inexpensive home-made

rubber tub is shown in the illustration (Fig. 17). The legs, each of which is thirty inches long, are pivoted upon

FIG. 17.—Home-made rubber bath-tub.

the ends of the central bar. This and the four side-bars are each thirty-six inches in length. The latter are fastened firmly to the legs. The tub itself is made of a single piece of white rubber cloth thirty inches wide and one and a quarter yards long. There is a hem at each end, and through these hems broad tapes, each nineteen inches long, are passed and securely fastened to the ends of the side-bars. The sides of the rubber cloth are tacked to the top of the side-bars. A small plait at each corner gives the tub a better shape. A little ingenuity can easily make the legs detachable from the central and side bars and from each other, and thus allow of packing the tub into very small space for travelling. Rubber tubs, however, are not as easily kept clean as those of metal.

FIG. 18.—China sponge-basin.

An outfit for bathing is not complete without a rubber cloth or an oil-cloth to be laid beneath the tub to protect the floor, and the low chair with a broad seat upon which the nurse is to sit, and to which reference has already been made. One of the small china sponge-basins made especially for the baby's toilet is also very serviceable. It is divided into two compartments—one for cold and one for warm water (Fig. 18).

After the child has reached the age of two or three years a second and somewhat larger tub may be bought. This is not an absolute necessity, as the ordinary stationary bath-tub can be used instead. It is, however, a great convenience, and saves the uncomfortable leaning over which is necessary with the latter.

In this connection it is important to understand fully the value of early accustoming a baby to immersion in water. I have frequently seen the great fear of the tub bath, shown by children who had been accustomed to sponging only, interfere with the use of cool bathing in cases of fever or of exhaustion by summer heat, at times when it would have been of the greatest remedial value. Moreover, it is wellnigh impossible to attain by sponging alone, no matter how thoroughly done, the cleanliness which tub-bathing ensures.

To prevent the fear of the bath developing, we should carefully avoid any sudden or rough plunging of the child into the water, and especially see that the head does not accidentally become submerged. Fear which has been acquired in any way may sometimes be overcome by covering the tub with a blanket, placing the baby in this, and gradually lowering baby and blanket into the water; or the child may be put into the empty tub and allowed to play there until it is quite at home, and may

then be accustomed to an amount of water which is increased a very little day by day.

A wash-cloth made of flannel or of diaper-cloth should be used for applying soap. A delightfully soft wash-cloth is made of cotton stockinet. All the folds and hollows of the body must be soaped thoroughly, but no effort should ever be made to force the fingers or anything else into the ears, and no water should be allowed to remain there. Severe inflammation of the ears has often followed over-zealous attempts at cleansing.

The scalp should be soaped daily during some months. After the age of six months, however, it is not advisable to do this quite so frequently, as it renders the hair dry and brittle. This does not mean that soaping of the head is to be neglected entirely. The application occasionally of a very little vaseline may be of benefit. As the infant grows into childhood the scalp should be washed with soap once or twice a week at least, and with water daily. Even the long hair of the girl need not prevent this.

The importance of daily retracting the foreskin of boy babies, and of washing carefully beneath it, must not be forgotten (see Phimosis).

For removing the soap-suds a sponge is better than a wash-cloth, since it permits of the water being squeezed from it in a distinct stream. Only the finest sponges should be chosen, from which the minute flinty particles have been entirely removed in the process of preparation. These little needle-like bodies are present in many of the cheaper sponges, and are very irritating to the skin even of an adult. The sponge and the wash-cloth should be well washed out and be thoroughly dried in the air after each bath before being used again. If this is done, there is no objection to their being kept in the rubber pockets with which the baby's basket is often furnished.

For washing of the eyes in the early days of life, fresh absorbent cotton is much to be preferred to a sponge. A fresh piece should be taken each time, and used for nothing else.

In the choice of soap there is a wide range. It is important to select one which is entirely unirritating and free from an excess of alkali. Transparent glycerin soap and oatmeal soap are good, but there are few equal to the well-known white Castile soap. As there are different varieties of this soap, some of which are not at all suitable, it is important to choose one of the finest imported brands, certainly made of olive oil and procured from a dealer of well-known reliability. Still better are some of the imported German "super-fatted" soaps, not medicated.

The water used for the bath should be soft and clear when it is possible to obtain it so. Very hard water will make the skin rough and sore. It may be improved by boiling, which precipitates much of the lime, but it is better to substitute rain-water. Muddy water must be filtered. This may be done through one of the various filters made to screw upon the faucet. A fairly serviceable plan is to tie a bag of flannel over the opening of the faucet and to let the water run very gently through it. A fresh bag should be used every day. The temperature of the water is very important. Our hands are so made that they accommodate themselves readily to degrees of heat or cold. They are consequently poor guides in determining the actual temperature of the bath. The bared elbow dipped into the water is much more sensitive; but if we do not wish to have the baby sometimes parboiled and sometimes frozen, it is far better to use a bath thermometer (Fig. 19). This may be had at any good house-furnishing store or drug-store. The

casing is made of wood, in order that the instrument shall not sink in the water. To test the temperature of the bath, the thermometer should be moved back and forth in the water for a few minutes, and the height of the mercury noticed while the bulb is still in it.

FIG. 19.—Bath thermometer.

The temperature of the first bath should be 100° F., and that of succeeding ones be lowered very gradually until, at the age of six months, the water is at 90° to 95° F. for winter or at 85° to 90° F. for summer. Actually cool baths should not be given before the age of four or five years, although by two years a cool sponging may immediately follow the warmer bath, providing the bracing effect is produced which may reasonably be expected. (For the temperature of hot, warm, and cool baths, etc., see Appendix, 39.) Whatever the temperature of the bath, it is important that the head and the face be wet before the rest of the body.

Enough water should be used in bathing to cover the baby to the neck when supported in a semi-reclining position. As it grows older and learns to sit upright the water need not reach above the armpits. The duration of the immersion should at first be one or two minutes, and later about five minutes. One bath should be given every day, but in very hot weather, when the baby is evidently depressed by the heat, several tepid or cool baths daily are sometimes very beneficial. In such cases they are given, of course, for their cooling effect, not for cleansing purposes.

Besides the regular daily bath, it is important to sponge the lower parts of the body after each bowel-

movement, in order to ensure perfect cleanliness. Simple warm water is usually sufficient for this, and soap should not be employed. Most careful drying must follow. In the early months of life an evening sponging of the whole body is often practised. It is frequently of advantage, but is not an essential.

When the child has reached the age of four years the bathing may consist of cool sponging every morning with water at a temperature of 75° to 80° F., the child perhaps standing in lukewarm water, but it is much better to continue the daily tub-bathing with water of 80° to 85° F. Prolonged soaking in hot water is to be condemned as excessively relaxing and as predisposing to catarrhal conditions. During later childhood the temperature of the bath may be reduced to 75° or 80° F. Of course, at no time of life should a bath be given soon after a meal.

In this connection the importance of following experience rather than theory cannot be too strongly insisted upon in regard to using cold water. If a child invariably shivers and continues cold after tepid or cool baths—that is, if a proper "reaction" does not take place—it will certainly be injured by continuing them. One must be quite sure, however, before abandoning them, that there is not something wrong about the method rather than about the baths themselves. Brief immersion and brisk friction afterward are all that are required to make the baths healthful and tonic for the majority of children.

The time for bathing a child is not so much a matter of importance as it is that the bath shall be given at the same hour every day, and not too soon after eating. At least an hour should elapse after taking food. It is also better not to allow the child to go out of doors immediately after bathing, especially in cold weather. During

the first two or three years of life a morning hour—either before breakfast or at about nine or ten o'clock—is to be preferred unless an evening hour be chosen for the sake of relieving sleeplessness by means of the bath. On the whole, bathing before breakfast is to be preferred for infants, as the later morning hour interferes with the morning outing. This is especially true in winter-time, since the daylight of the afternoon is too short to allow an infant to be out sufficiently long. Later the daily bath is best given when the child rises in the morning.

A fuller consideration of baths of different temperatures and of different sorts, particularly as used in disease, will be found in the Appendix (39–54).

The choice of towels is of some importance. Especially for young babies they should be of the softest and most absorbent material. An old diaper constitutes one of the best of towels at this age, and later in life Turkish toweling, not new, is excellent. After the drying it is well to rub the baby briskly with the palm of the hand until its skin is slightly reddened, in order to establish a good circulation of the blood. Sometimes rubbing with warm alcohol or warm bathing whiskey or with a little olive oil is of distinct value for delicate children.

Some difference of opinion exists regarding the advisability of powdering the child after the bath. In theory, the drying should be so perfect that powder is not needed. In practice, however, it is difficult to obtain this perfect dryness, or to appreciate the failure until the production of chafing and fissures of the skin shows that there has been a fault in this respect. It is therefore a useful plan, after using the towel as thoroughly as possible, to powder the folds of the skin, as around the neck, about the ears, in the armpits and groins, and behind the knees. The powder used should be of the simplest kind, such as

finely-powdered starch or, still better, talc. It is best to avoid the various scented powders on the market, since they may contain impurities. Sometimes a little vaseline or cold cream may be applied with advantage instead of the powder. This is especially true if the creases in the skin appear to be somewhat too dry.

We must consider briefly the subject of out-door bathing, and particularly of sea-baths. The action of salt water seems often to produce a peculiarly beneficial effect upon weakly children. Too much cannot be said against the exhibition of basest cruelty which may so often be seen—a father or mother carrying a screaming, terrified little one of tender age into the breakers. The exposure to the cold water and the action of the great fright can be nothing but very injurious. The only fit place for infants to take a salt bath is the tub. There is no harm, however, in dressing a child of three years of age, or even younger, in bathing-clothes, protecting it from the sun by a bathing-hat of suitable size, and allowing it, on a calm, warm day, to paddle in the ripples on the sand or to play in the pools of sun-warmed water left by the receding tide. In this way the child's confidence in the harmlessness of the water is established, and at the same time the good effects of sea-bathing are gained without fright. The mother must never forget to watch carefully against chilling by too long a wetting or by exposure to strong winds in moist clothes.

Older children who have acquired a love for surf-bathing or fresh-water bathing would apparently remain in the water for ever if permitted to do so. The mother must enforce a limitation of the bath to ten minutes at the longest if the water is cool, or twenty to twenty-five minutes if warm. Chattering of the teeth and blueness of the lips are indications that the bath should cease, no

matter how short it may have been. The after-effects are a still better guide in the matter. Exhaustion or lassitude during the rest of the day renders necessary a reduction of the length of the baths or of their frequency. Not every child can bear a daily out-door bath.

In the case of sea-bathing it is important to guard against blows of the breakers against the ears, since injury to the drums may result. The mere gentle entering of the water into the ears is harmless.

There are certain other matters connected with the toilet which can best be considered in this connection. Prominent among these is the washing of the mouth and teeth. Babies are much disposed to various forms of inflammation of the mouth. It is necessary, therefore, that a toilet of the mouth be performed systematically, and yet it is just as important that this be done with the greatest care and gentleness, or there will be produced the very trouble which we are striving to prevent. Nurses often forget their own size and strength and roughly force a big finger into a delicate little mouth, thereby doing much more harm than good. To perform the toilet properly a little absorbent cotton should be wrapped around the little finger or around a smooth stick, taking care that the cotton project decidedly beyond the end, and with this moistened in boiled lukewarm water and used gently the washing can be done very satisfactorily. It should be repeated three or four times a day, or, better still, after each feeding, of course using a fresh piece of cotton on each occasion. After the child begins to secrete saliva in abundance and to move the tongue freely it is unnecessary to wash the mouth so frequently.

Mothers often think that it is a matter of no consequence if the milk teeth decay, since they will soon fall out in any case. This is far from the truth, for not only

does their decay detract greatly from the child's good looks and become a fruitful source of toothache, but their imperfection or loss is a cause of indigestion from insufficient mastication, and may even cause irregularity in the position of the permanent teeth.

The washing of the mouth should be continued as the earliest teeth are cut, and the teeth themselves thoroughly rubbed with a moistened cloth morning and evening. After the majority of the milk teeth are through the gums, a small tooth-brush with soft bristles of badger-hair or goat's hair is to be preferred. One of soft pig's bristles may be employed if used carefully. If any stains appear on the teeth a little precipitated carbonate of lime in finely powdered form may be used on the brush. If this does not prove successful in removing the discoloration, a small pine stick, such as a match-stick, may be sharpened into a chisel-shaped edge, moistened, dipped in finely powdered pumice-stone, and rubbed upon the spots until they are removed. Care must be taken to avoid injuring the gums while using the stick. The collection of tartar upon the teeth is the commonest cause of inflammation and receding of the gums, and nothing but diligent watchfulness will prevent it.

As early as possible the child itself should be taught to use the tooth-brush and powder twice daily, and to draw waxed floss silk between the teeth or to use a quill tooth-pick—in private—after each meal. Should decay take place, it is all important to have the trouble corrected by a dentist. Indeed, it is best in any case to let the child pay its first visit to him not later than the age of two years, and after this regularly at intervals of six months. In this way the milk teeth may be prevented from decaying, and, in addition, will not be allowed to remain in place after they have commenced to interfere with the cutting of the second set.

Besides the washing of the hair, of which we have already spoken, it is, of course, necessary to brush it, not only for appearance's sake, but also because frequent thorough brushing improves the scalp. The hair-brush for the baby's first use is made of camel's hair, in order not to irritate the scalp. As the child's hair increases in quantity and becomes less fine, a coarser brush must be procured, with bristles stiff enough to remove all dandruff from the skin. Combs of any sort ought to be employed only to part the hair, and even for this purpose it is not advisable to use them in infancy, except with the greatest care. The hair should be trimmed often. It is true that short hair is not so pretty, but it adds to the comfort of the child, and even little girls of four or five years or older may wear the hair short with decided advantage in this respect. They will easily make up lost time when it is finally allowed to grow uninterruptedly. Certainly no boy should be made to wear long hair in curls after he puts on trousers, unless his mother wishes to subject him to the ridicule of his boy companions. Contrary to a commonly-accepted idea, the cutting of the hair has no effect in improving its growth. So, too, the clipping of the eyelashes does no good. They do not become longer as a result of this, but may grow coarse.

The cutting of the finger-nails and toe-nails requires some attention. The finger-nails should be kept trimmed with scissors, yet not down to the quick nor too much at the corners. They may be kept clean with a soft nail-brush, and all the hang-nails be cut off close to the skin. The toe-nails should be cut straight across, and the corners should never be rounded off. The following of this plan will aid in the prevention of ingrowing toe-nails.

The completion of the baby's toilet—namely, dressing—can be more conveniently considered when studying the nature of the clothes, in the next chapter.

CHAPTER V.

THE BABY'S CLOTHES.

In this chapter we must first consider the clothing required in earliest infancy ; then that needed after shortening of the clothes has taken place; and, finally, that to be used after baby-clothing is abandoned. The chief requirements of an infant's dress are looseness, softness, warmth, and simplicity. We usually avoid in this country the custom prevalent in some others—that of wrapping a child in swaddling-clothes in which it is actually rolled up like a small bundle. Yet even with us infants often are not dressed in a way to allow of the freedom of motion that is desirable. The binder is so tight that the ribs and abdomen are compressed and digestion is greatly interfered with, and sometimes even vomiting is produced, and the skirts are so long that the baby can move its legs only with difficulty.

The clothing should be soft and light, in order that the delicate baby-skin be not irritated. Not only softness in surface but softness in texture also is required; that is, the material ought to be porous and not too heavy, in order that evaporation of perspiration and the proper ventilation of the skin may take place. Simplicity is also important. This does not mean merely that the clothing be simply made, but that the whole arrangement be simple as well. If the garments are elaborate, not only is the expense of providing them very greatly and unnecessarily increased, but, more especially, the temptation arises of letting them be worn too long without washing. Still, if a mother desires to make the baby's clothing of this nature, there is no real objection

to it although it may not be wise. The other kind of simplicity, however, is a positive requisite. Every unnecessary garment renders the exertion of being dressed and the burden of the clothes that much greater. To be rolled first on its stomach and then on its back an indefinite number of times while one layer of clothing after another is put upon it cannot but be very distressing to the baby.

Finally, and the most important of all, the child's clothing must be warm. Children, particularly in infancy, are peculiarly unable to resist the depressing effects of cold, and every care must be taken to guard against this. In prematurely-born infants life depends largely upon the maintenance of the body-heat. We all know, or ought to know, that it is not the part which is exposed which necessarily feels the effect of exposure. A child may develop pneumonia or diarrhœa just as easily from chilling of the arms or legs as from direct exposure of the chest or abdomen. Consequently, the custom of dressing with thin sleeves or with short dresses and bare legs cannot be too strongly condemned. It is a practice which in cool weather is both dangerous and cruel. No parent would be willing to dress in that way, even did custom sanction it. Even in summer-time it is dangerous, especially in infancy. A child will be little, if any, warmer with a thin covering over the legs, and will undoubtedly be very much safer. It is a great mistake to try to "harden" a child by letting draughts blow on it and by covering it with insufficient clothing.

Garments which are loose, and those made of material of loose texture, are warmer than others, on account of the air which they retain in their folds and interstices; for air, as is well known, is a very poor conductor of heat. There is no material which, in theory at least,

answers all the requirements as well as wool. It is at once soft, loose textured, light, and warm. With the exception of the diapers, all the clothing which comes next to the skin of the child should be made, when possible, at least partly, of wool. Its weight must, of course, vary with the season of the year, and its texture should always be of the very softest.

On the other hand, we must be careful not to have the underclothing *too* warm. The circulation is very active early in life, and the dressing of children in such a way that perspiration follows the slightest exercise is a great cause of taking cold. Even in winter the underwear should be of only moderate weight, and outer wraps be used if the room chances to be cooler than usual, or for out-door use.

While all-wool garments next the skin are to be preferred from a hygienic point of view, there are some grave objections to them. First among these is their great tendency to shrink, and consequently to become both harsh in texture and much too tight. The fact that so many ways of preventing this have been proposed indicates that none of them is entirely satisfactory. Now and then a laundress will be found who really understands the washing of woollens, but this is certainly the exception. A method of overcoming this difficulty consists in the employment of "merino" goods, made of a mixture of cotton and wool, or of goods consisting of silk and wool combined. Yet even these shrink badly if too much wool is present. Unshrinkable woollen garments are now advertised in the shops.

The other chief objection is that to some babies' skins, particularly in hot weather, all-wool clothing is very irritating. In such cases a garment of silk may be worn in place of the woollen one. Yet silk is apt to be chilling

to some extent, and a better practice is to use merino goods, or a silk and wool fabric of a sort which contains only a small portion of wool, or machine-knitted goods entirely of cotton. The soft porous cotton stockinet, made of different thicknesses for summer and winter, is very satisfactory. In the hottest weather it may be necessary to use cotton gauze.

Having now considered some of the general principles which underlie the choice of materials used in the dressing of children, we may look more in detail into the character of the individual articles required. Most of them can be made at home, and paper patterns for them may be bought of the dealers. It is more convenient, however, although less economical, to buy the garments ready made, and some of the clothes, such as all the close-fitting ones, are much better when not made at home. The larger establishments for children's and infants' clothing keep a line of varying sizes and weights.

The binder, or abdominal band, is the term applied to the bandage which is commonly placed around the child's abdomen next to the skin. Many physicians are opposed to it utterly, and there is no question but that it is capable of doing great harm if improperly used. As a means of support it is entirely unnecessary. The only object of the bandage is, at first, to keep the umbilical cord from being pulled upon by the clothes, and, later, to furnish a loose covering to the abdomen to prevent chilling. It can be done away with if the shirt is made to fasten to the diaper, but, on the whole, it is an advantage, provided only we remember that most important fact, that a binder must never bind. Nurses are much disposed to draw it very snug. This makes colic worse, when the baby is troubled with gas, by not allowing the abdomen to distend; and there is danger, too, of producing rupture in

the same way, instead of preventing it, as it is sometimes supposed that a close binder will do.

The best form of binder is the knitted circular one, on account of the greater elasticity which it possesses. This can be bought ready made or can be knitted or crocheted at home. It should be circular, and be wide enough to extend from the hips well over the ribs—that is, about six inches in width (Fig. 20). It is preferably made with shoulder-straps or it may be simply pinned to the shirt. There is usually a little tab in front and one behind, to which the diaper may be pinned. If it is desired to make the binder of flannel, it should be of the width mentioned and long enough to go somewhat more than once around the body—that is, about twenty inches in length. The flannel should be of the softest kind, cut bias in order to increase its elasticity, and unhemmed. The knitted binder is, however, preferable except, possibly, for the first week of life—*i. e.*, until the cord separates. The flannel binder is more easily applied at this time, and occasions less danger of pulling the cord, but with even ordinary care the other can be readily used from the first.

FIG. 20.—Abdominal band.

Diapers, or napkins, should be made of soft, light, and absorbent material, and it is important to have them not too heating, especially in summer. Perhaps the best materials are linen and cotton diaper-cloths. Each of these has its advantages. Linen is cooler and less bulky, while cotton is more absorbent. Canton flannel is not to be recommended, as it is too little absorbent, and soon becomes harsh as a result of washing. The diapers for

the early months of life should be a yard long and half a yard wide when hemmed. The material should be washed before it is cut, to prevent shrinking afterward. By the time the child is three months old the width will often need to be increased to twenty inches and the length also to double this, and by about nine months further increase in size must often be made. The diaper is folded into a square, and this again into a triangle, making four thicknesses in all. A second diaper may be folded into a square and be laid under the hips to prevent the moisture reaching the clothes; or it may be pinned around the waist in the usual triangular form, but with the point allowed to hang down behind. Instead of this

FIG. 21.—Diaper with diaper-square.

arrangement, which is rather heating and bulky, especially in summer, it is often a good plan to use a small diaper folded two or more times to form a square of nine or eleven inches ("diaper-square")—just large enough to receive the urine and the passages from the bowels. This square is held in place by a thinner and larger linen diaper, which surrounds the hips in the usual way (Fig. 21). An excellent diaper can be purchased of cotton

stockinet. It is not only very soft and absorbent, but also is shaped to fit the hips, and must be much more comfortable to the baby than the ordinary form is.

A rubber or other waterproof cover should never be applied outside the diaper. It is very heating and is liable to produce chafing and eczema.

The diapers should always be changed just as soon as soiled, and should on no account be put on again until they have been washed, even though they have been moistened with colorless urine only. It is always dangerous simply to dry them and then to use them again. Nothing but pure soap, not too alkaline in character, should be employed in washing them, and soda ought to be avoided carefully, as otherwise a great deal of irritation of the skin may result. They should be passed through several rinsings of fresh water, to be sure that all soap has been removed. After washing they should be aired for a day before they are used, in order that they may become thoroughly dry. All new diapers ought to be washed several times before the baby uses them, in order to render them quite soft.

FIG. 22.—Knitted sock.

The rule regarding the immediate changing of the soiled diaper is open to exception during the night. It would manifestly be unwise to rouse a baby every time it chanced to pass urine at night. If it wakes of itself, the wet diaper should be changed.

Crocheted or knitted socks are an essential if the baby's skirts are made as short as is advisable, and even with the longest skirts they are to be recommended. They are made of silk thread or of soft yarn, reach fully half-

way to the knee or higher, and tie about the ankle with a narrow silk ribbon or a knitted cord (Fig. 22).

All babies are clothed in much the same way as regards the garments already mentioned, but for the rest we have the choice of several forms of clothing. Of course, various minor modifications exist, but there appear to be three principal styles on which these are based. The first or oldest style consists of a shirt, a skirt fastened to a broad muslin band and called a "barrow coat" or "pinning blanket," often a second petticoat, and then an outside dress or slip. The second variety is like the first, except for the important difference that the band of the petticoat is replaced by a loose waist with arm-holes; or the whole garment is made in "Princess" style—that is, without a distinct waist. The third form, to which various special names have been applied, consists of three garments, all loose and of the Princess pattern, the ordinary close-fitting shirt and even the band being done away with.

The first style of dressing, not so often employed now as formerly, is decidedly objectionable. In this the petticoat consists of a skirt of flannel reaching below the feet and attached to a muslin band which is deep enough to reach from the armpits to the hips. This band must of necessity be long enough to overlap considerably, to permit of pinning and to give room for growth. Such a garment as this breaks all the rules that we discussed as requisite for infants' clothing. It is cumbersome, it is more difficult to put on, and, above all, it is too tight. The closeness of application required to enable the band to support the weight of the skirt exerts far more pressure than the delicate ribs of the baby should receive.

The second style of body-clothing is one which can be highly recommended. The shirt should be made of one of the materials already recommended for use next the skin. For winter it should be warm; for summer, made of the same materials, but thinner, and for the hottest weather, very thin. In all seasons it should be long enough to reach below the hips, and should have sleeves extending to the wrists, and a high neck. It should be open the full length in front, and be fastened by small flat buttons (Fig. 23). It should be sufficiently loose not to compress the chest even after some shrinkage in washing. A shirt with a chest-measure of fifteen inches is generally sufficient during the first three months of life. If it is too large, a smooth plait may be taken at each side. The shrinkage from washing can be avoided to a considerable extent by stretching the garment over a wooden form while drying.

FIG. 23.—Shirt.

The best material for the petticoat is white flannel. This may be made in one piece, in Princess style, or it may consist of a flannel skirt attached to a loose cambric waist (Fig. 24). The latter form is certainly to be recommended for warm weather, and is really warm enough for any season of the year. The petticoat should have arm-holes without sleeves, and be fastened at the back with three small, flat buttons.

It a great mistake to make infants' skirts too long, as it serves no good purpose, and impedes very greatly the freedom of their motions—that exercise of their legs which is so to be desired. The petticoat should reach not more than six to ten inches below the feet. A length

of twenty-five inches from the neck to the hem is quite sufficient. Some mothers prefer to have a second cambric or nainsook petticoat over this, as it prevents the flannel showing through the dress, but this makes an extra, unnecessary garment and complicates the process of dressing.

The slip or dress is of nainsook or lawn, loose, and of any style that suits the mother's fancy. It should fasten behind with buttons with or without a narrow ribbon, and should have sleeves coming to the wrists (Fig. 25).

FIG. 24.—Infant's long petticoat.

FIG. 25.—Infant's dress.

Its length should equal or slightly exceed that of the petticoat. Of course, both the slip and the hem of the petticoat may be trimmed according to taste.

The third style of clothing, at one time very popular, consists, as stated, of three garments, and neither close-fitting shirt nor binder is used. The use of the binder, however, does not interfere with the plan of the suit. All these garments are cut in Princess style. The inner one, which takes the place of the ordinary shirt, reaches

from the neck to ten inches below the feet—that is, is twenty-five inches in all in length—and has sleeves to the wrist. The middle garment, corresponding to the ordinary petticoat, is of flannel for winter and muslin or cambric for summer, has scalloped neck and arm-holes without sleeves, and is half an inch larger around and two to four inches longer. The third garment, the slip, is of the ordinary material, with high neck and long sleeves, and is slightly wider than the last and thirty or more inches in length. All are fastened behind with two or three small buttons. The chief advantage of this style, apart from the looseness, is the very great convenience in dressing. The three are put together, one within the other and sleeve within sleeve, before they are put on, and then all are drawn on at one time as though they were but one.

The third style of clothing is superior to the second only in the simplicity and the ease of dressing the child. It is distinctly inferior in that the under-garment does not adhere closely to the body, and is therefore more apt to let the air reach the skin too freely.

All things considered, the second style of clothing is, the writer thinks, much to be preferred, and is the one which will be described in the following pages.

If the mother desires it, she can have the baby's clothes open in front instead of behind. This has the theoretical advantage that the child does not have to lie upon buttons, tapes, or pins. Practically, it makes little difference if the clothing is put on carefully and the child is not laid upon a hard surface.

The length of garments in inches as given applies only to the first two or three months. They can, of course, be made with a hem sufficient to let out as the baby grows. So, too, the buttons can be shifted and the wrist-bands lengthened if the garments have been made large enough

at the outset. It is better, however, not to have too many clothes at first, and to buy or make larger sizes as needed.

The clothes for the night should be a complete change from those worn during the day. They consist of a binder, a diaper, a shirt, and an outer night-slip. This latter should be longer than the day-slip and very roomy, in order to allow of free movement of the legs. For winter time it should be of flannel, Canton flannel, or cotton stockinet, and made to close with a drawing-string or with buttons at the bottom (Fig. 26). Perhaps a still better garment consists of a long and wide night-gown, closed at the bottom without a seam, and with a long opening at the back fastened by a number of buttons. This garment gives ample room, keeps the feet warm, and allows of changing the diapers without undressing the child. For hot summer weather the night-gown may be of muslin, thin outing flannel, or cambric, and need not be fastened below. The baby requires no socks when in bed, but may have some night-socks to slip on when it has to be taken up. The necessity for fastening down the bed-covers if the baby is restless is referred to again in the chapter on Sleep.

FIG. 26.—Night-gown closed by a drawing-string at the bottom.

A certain number of garments are needed besides those mentioned. There is, in the first place, the old blanket in which the child shall be received immediately after birth, and which has been spoken of in describing the contents of the baby's basket in Chapter IV. There should also be a warm shawl or shoulder-blanket, made of very soft flannel, which can be thrown about the baby and over its head when it is carried from one room to another or when it is taken

up at night. The shoulder-blanket should not be used except under these circumstances. A cap to be worn in the house is not needed unless the child shows a great disposition to take cold. A thin cambric cap is then sufficient, but even this should not be used except by the advice of the physician in charge. A knitted worsted sack is often useful if the room happens to be cooler than usual. A flannel or wash-flannel wrapper is also very serviceable in the mornings, before the baby receives its bath.

The clothing for use out of doors varies, of course, with the season. In winter there is needed a long, very warm cloak (Fig. 27) of some woollen material such as cashmere; a warm, thick, lined cap (Fig. 28) or hood covering the ears; a bobbinet or Shetland veil if the weather is windy or cold, and warm, knitted mittens. In summer weather only a thin cap is required of cambric or silk. Occasionally a

FIG. 27.—Infant's cloak.

FIG. 28.—Infant's cap.

neutral-tinted or darker veil is required to protect the eyes if the glare out of doors is very great.

We may pause here just a moment over the steps to be followed in the actual process of dressing a young infant,

although this is something which seems to come almost intuitively to most mothers. After the new-born baby is bathed and dried it is laid upon its back in the nurse's lap, with the diaper in position under its hips. The nurse sits in the low chair already referred to (p. 69). If a binder of flannel is used, it should at the same time be laid in place under the back. The stump of the umbilical cord is now dressed. The best method of doing this is to envelop it well in salicylated absorbent cotton, which can be procured at any first-class drug-store. It is then wrapped about with thread and laid against the abdomen upon the left side. The binder is then brought up from each side and pinned with safety-pins, or, if the circular knitted binder is used, is drawn up over the feet. It ought always to be so loose that the hand will slip easily between it and the skin. The diaper is now brought around from the sides and back, and pinned with a safety-pin to the tabs of the band, taking care that the hand can slip under it readily, as in the case of the binder. The socks are next put on, and then the shirt. The petticoat and dress are first adjusted to each other and are then slipped on together over the feet. After the baby is old enough to sit alone they may conveniently be slipped over the head. If the third style of clothing is adopted, all three garments are slipped on at one time after having first been put together, sleeve within sleeve.

At bed-time all clothing worn during the day is removed, a fresh binder and, if necessary, a fresh diaper are applied, and the night-clothes put on.

The wrappings of the umbilical cord are kept carefully dry while the infant receives its daily sponge, provided they seem to be without odor. By the fourth or fifth day the stump will have fallen off, and the daily tubbing may be commenced. The sore left at the attach-

ment of the cord may now need very careful washing with moistened absorbent cotton, followed by drying and powdering with boric acid. It is a useful plan to place a dry compress of sterilized gauze over the navel under the binder, in order to guard against rupture.

There is scarcely anything about which there is so little uniformity of opinion as the number of changes of clothing which should be provided in advance for the baby. This is not only because mothers vary in the frequency with which they have laundry work done, but also because the number of garments which can be made to answer very well where economy is a matter of consideration may not seem at all sufficient to those anxious to have the baby very abundantly supplied.

The following list of clothing—the *layette*, as it is commonly called—may be considered one of average size:

LONG CLOTHES.

Flannel binders	3
Knitted bands	4
Diapers	4 dozen or more.
Shirts	6
Petticoats, flannel	4
Petticoats, cambric (if desired)	4
Slips	8
Socks	6 pairs.
Night-gowns	6
Wrappers	3
Sacks, knitted	2
Cloak	1
Hood	1
Mittens	1 pair.
Veil	1
Shoulder-blankets	2

There are certain other articles to be provided in advance, but they are more appropriately described else-

where, when considering the baby's basket and the baby's bed. There is one, however, and a very serviceable one, which may be mentioned here—namely, the lap-protector, although this is rather for the mother's use than for the baby's. A very good pattern is shaped like a pillow-case, fastens at one end by buttons, and is made of corduroy, Turkish toweling, or some similar thick, washable material. It may be trimmed simply in any way desired. A doubled piece of rubber sheeting is made to slip inside of it. The rubber may be slipped out, and both it and the case washed when soiled. Instead of this, lap-protectors may be made of squares of nursery cloth, which can be thrown away when soiled. Still another useful article is a small soft pillow on which the baby can lie or be carried about during the early weeks of life.

When the baby has reached the age of six months, more or less, depending on the season of the year, the time for "shortening" the clothes, or "short-coating," has come. The change should not be made in winter if it can be avoided. The number and material of the garments remain nearly the same as before. The shortening may be accomplished by cutting down the skirts of the long clothes already in use, lengthening the sleeves, and letting out the waists if they have been made sufficiently large at first to allow of this. The third style of garments referred to is not at all suitable for children in short clothes, as the loose shirt permits much too free access of air to the body. The use of the binder is continued. Short clothes also necessitate a decided change in the covering of the feet and legs, which would otherwise be left too much exposed to the air. There is, of course, a great temptation for the admiring mother to leave the baby's plump little legs bare, but the practice

is capable of doing great harm. There should be stockings long enough to reach to the diaper. They may be pinned to this, but a better way is to button them to broad elastic bands which can be buttoned or tied to tapes fastened to the inside of the upper part of the petticoat, or to a separate waist if one is worn (pp. 103 and 110). Stockings of wool or of partly woollen goods, and of a thickness varying with the season of the year, are probably to be preferred, but they frequently shrink so badly that cotton or silk stockings are often more practically useful, especially in summer time. The shrinking may be prevented to a considerable extent by stretching them over a wooden stocking-frame while drying. The toe should not be pointed, and the whole stocking-foot should not fit too closely, since the constant elastic pressure which it exerts may do harm. Indeed, the stockings ought to be rights and lefts, if such forms can be bought or made. A great breadth of toe is very desirable. Care must be observed that the interior is perfectly smooth and free from loose threads, knots, and wrinkles.

The stockings should be white or of some color which is known not to contain any injurious substance capable of irritating the skin. In winter it is sometimes of advantage to furnish a child in short clothes with drawers also. These may be made of woollen or merino goods or of Canton flannel. It is convenient to make the legs separate, to button or pin to the upper part of the petticoat. They should fit rather closely and should reach to the shoe-tops (Fig. 29). Drawers of this pattern combined with the use of short stockings may entirely take the place of long stockings throughout the year, if it is so desired. In this case their weight varies, of course, with the season. Ex-

cept that they are more easily changed when wet, they have no special advantage over long stockings, and the latter alone generally answer every purpose until the age when the diaper is abandoned.

FIG. 29.—Drawers with separate legs.

When the baby becomes more active, and especially when it begins to creep or to stand, there is often a great deal of trouble with the diapers, which exhibit a tendency to fall off at the most inopportune moments, unless drawn much more tightly than is healthful. This may be obviated by pinning the diaper to the shirt, or to both the front and back tabs of the binder. It is important not to have too many thick folds of diaper between the baby's thighs when walking is commenced, as it tends to produce bowing of the legs.

Another very serviceable article are the "diaper drawers" (Fig. 30). These are made in the shape of a triangle, fasten about the waist by buttoning in front, and are supported by pinning to the band. They should not be made of waterproof material (p. 92). The stockings may be fastened to the diaper drawers if desired. Put on over the diaper, the drawers serve to keep this in place and to protect the underclothes from becoming wet. Very neat and light little waists can be bought or made, and to these both diapers and stockings may be fastened, in place of any of the plans mentioned (Fig. 31). If such a waist is employed, flannel skirts may be made without waists of their own, but with a band buttoning to the same waist to which the diaper is fastened. If a white skirt is also used, it may be made to button to the

same waist. Having the skirts thus separate obviates the necessity of undressing the baby to so great an ex-

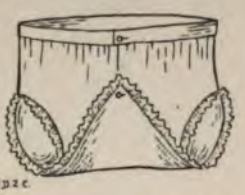

FIG. 30.—Diaper drawers.

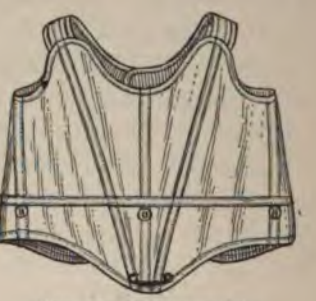

FIG. 31.—Diaper waist.

tent in case they become wet from the diaper and require to be changed.

With the short dresses the baby may put on shoes, although it does not really need them until it begins to stand or to creep. In place of these we may at first use moccasins of chamois leather, kid, or felt. These are for sale in the shops, but they can be easily made at home. They form a very serviceable foot-covering, although there is difficulty in keeping them on unless they are well made and rather high on the ankle. The first real shoes should be of soft kid, with kid or thin leather soles, and of course without heels. Their shape is of great importance, since the softness of the tissues renders the deforming of the feet by improper shoes very easy. Not only should the shoe be somewhat longer than the foot and fully as wide, but it should be made to fit the foot, not the foot forced to fit the shoe. The toe should be wide and loose to permit the foot to spread, but the instep and heel should fit closely or the foot will turn and rub. Flat laces are better than buttons, since they allow of a more perfect adaptation. The shoes ought always

to be rights and lefts, for, although a baby's foot is fat and plump, it is in reality built on exactly the same lines as the adult foot—that is, the undeformed adult foot, The illustration (Fig. 32) is of the sole of the right foot of a child of thirteen months. It is a reproduction from life, reduced to three-quarters of the natural size, made by rubbing the sole with a little lampblack stirred in turpentine and sweet oil, and then pressing it against

FIG. 32.—Imprint of foot (from life, three-quarters natural size).

FIG. 33.—Outline of sole of shoe to fit Fig. 32.

blotting-paper pinned on a board. The illustration seems unnatural and distorted at first sight, yet it shows how a foot actually presses upon the ground in walking, and proves the great importance of having the shoes rights and lefts even from the beginning. The outline in the adjoining illustration (Fig. 33) represents the shape of the sole of a shoe which would fit this foot. For actual use, it should, of course, be made slightly larger in order to keep the uppers from exercising undue pressure.

Shoes of a proper pattern were difficult to obtain, since shoemakers found it easier to make them on the old model, according to which either one will fit equally well—or rather ill—on either foot. There can now, however, be procured from the leading dealers shoes which are rights and lefts, and which conform to the natural shape of the foot of the youngest infant needing shoes at all.

Sometimes a baby suffers greatly from cold feet shortly after it first begins to wear stockings and shoes. Frequent rubbing of the bare feet and the making of the shoes somewhat looser about the instep and ankle will overcome the trouble. After the baby is walking out of doors the thickness and stiffness of the sole must be increased, to protect the foot from being injured by irregularities in the ground.

Knitted sacks are still needed during the time short infant-clothing is worn, and wrappers serve the same purpose as before. The wrapper should be long and loose, and neither it nor the night-slip partakes in the general shortening. Even before the time of shortening, bibs may be needed to catch the greatly increased flow of saliva. These should be made of soft, absorbent, cotton material, and be quilted (Fig. 34). There is no objection to the placing of a somewhat smaller bib of rubber cloth under the cotton one. Later, larger bibs will be required for use when the child is eating. A very serviceable article when the baby begins to creep is a creeping apron. In the pattern shown in the illustration (Fig. 35), the lower portion consists of a wide, roomy, bag-like shirt, closed at the bottom and large enough to hold the skirts easily. This is fastened to a yoke above, which is provided with wide sleeves and

FIG. 34.—BIB.

wide arm-holes to permit of the arms easily slipping into them, and is buttoned down the back. At the lower end of the apron are two openings for the legs. These are gathered into bands fitted to the legs and are made to fasten below the knee. There should be a distance of fifteen inches between the holes. The whole width of the skirt at the lower end should be twenty-seven or more inches. This device will effectually protect all the garments and will check the action of draughts along the floor. Creeping aprons of this description can easily be made at home, but cannot, I think, be bought in the shops. If the mother finds the upper portion to be too warm, the yoke and the sleeves may be dispensed with, and the bag-skirt be gathered into a band, from which shoulder-straps may pass over the shoulders and cross over the back. Of course this latter plan fails to prevent the sleeves of the baby's slip from becoming soiled. In place of the creeping apron, overalls or rompers are sometimes employed (p. 111).

FIG. 35.—Creeping apron.

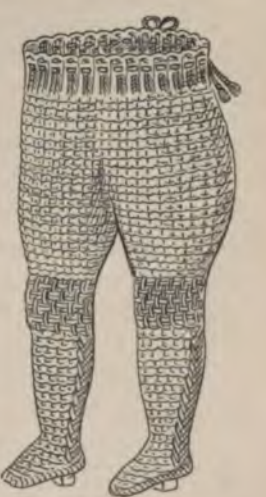

FIG. 36.—Knitted leggings.

There is a form of creeping apron sometimes recommended and sold which should be avoided. It consists of a very wide pinafore gathered at the bottom of the

skirt into a band, which fastens around the waist under the clothes. This arrangement protects the clothing well, but leaves the legs more than usually exposed, since it holds the skirts away from them.

For outdoor use a coat which is shorter than the long cloak of infancy is needed after the child has learned to walk. Warm knitted leggings (Fig. 36) which cover the whole lower half of the body up to the waist are serviceable in cold weather. Those made of Jersey are still better, as they are just as warm and much less bulky.

The following list may serve as a guide to the number of garments needed at this time of life:

SHORT CLOTHES.

Knitted binders	4
Diapers	4 dozen.
Shirts, close-fitting	6
Petticoats, flannel	4
Petticoats, cambric (if desired)	4
Dresses	8 to 12
Stockings	8 to 12 pairs.
Shoes	2 pairs.
Drawers (if desired)	8 to 12 pairs.
Creeping aprons	2
Wrappers	3
Sacks	3
Bibs	12
Night-gowns	6
Cloak or coat	1
Hood or cap	1
Leggings	1 pair.
Veil	1
Mittens	1 pair.

The time for changing from the clothing of infancy to that of childhood depends not so much upon the age as upon the time when the baby learns to do without a diaper. Two years of age is a late period for acquiring

the proper control, and most children should be able to have the change made by a year, at least during the day-time, if there has been careful training.

FIG. 37.—Long merino drawers.

FIG. 38.—Short merino drawers.

FIG. 39.—Muslin drawers.

After the change has been made it is still important to ensure thorough protection against cold, while at the same time the clothes are loose. The style of garments and their number is a matter of minor consequence, and may be determined largely according to the fancy of the mother, although the binder should be worn until the age of two years. With the exception of the head and hands, no part of the body should be left exposed to the air, unless it be on the very hottest days of summer, and even then the child is little, if any, warmer, and is certainly much safer, if fully covered with garments of very light weight and texture. The undershirt should be long-sleeved and high-necked, and of woollen or merino of a thickness depending on the season of the year.

The drawers for winter use (Fig. 37) should be long and of warm material, such as Canton flannel, merino, or cotton stockinet. It is very customary to cover these

with short muslin or cambric drawers (Fig. 39) for the sake of appearance. For spring and autumn use short merino drawers (Fig. 38) and warm stockings may be used. In summer the lighter muslin drawers may sometimes entirely replace the others, depending largely on the temperature and the climate in general. The stockings should vary in thickness with the season, but should always be long. A loose-fitting, high-necked, sleeveless waist (Fig. 40), of warm material for winter and of cambric for summer, is conveniently worn over the shirt.

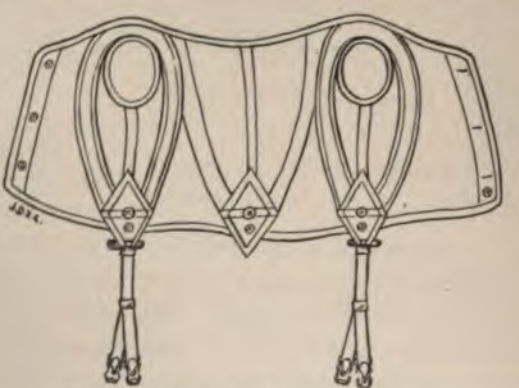

FIG. 40.— Waist for skirts and stockings.

To this the stocking-supporters and drawers are attached, and in summer the white skirt (Fig. 41) as well. Circular garters ought never to be worn. In winter the child must wear, in addition, a flannel skirt attached to a cambric waist of its own, to which the white skirt also may be buttoned (Fig. 42). Instead of this plan both skirts may be detachable, and buttoned to the same waist if desired.

The child's outer dress may be of material, quality, and ornamentation in accord with the season and the prevailing styles. It is most customary to keep children in

white dresses until the age of two or three years. This is not necessary, however, and if colors in light woollen material, or in cottons for summer, are preferred on account of the saving of laundry work, it is well to remember that certain colors for use in the sunshine are much hotter than others. Black is twice as hot as white,

FIG. 41.—White skirt.

FIG. 42.—Flannel skirt with waist attached.

and blue, even light blue, nearly as hot as black. Red stands about midway between black and white, with green hotter and yellow cooler than it.

The long skirts reaching almost to the ground, which have been at times the fashion for small children, especially girls, are not at all to be recommended. They are very much in the way, and offer a great hindrance to the active movements which are so much to be desired.

Overalls and rompers, the latter being provided with waists with sleeves, the former only with shoulder straps, are excellent at this age both for boys and girls, and serve to keep the clothing from becoming soiled in play. Indeed, they may often be used with advantage at the age of a year or earlier.

As the child grows older its style of dressing will, of

course, vary according as it is a girl or a boy. The time and manner of showing the difference of sex by the dress is not a matter with which we can concern ourselves greatly in a book of this nature, and we must consider it only briefly. No change at all is made until the age of

FIG. 43.—Costume for boy.

FIG. 44.—Costume for girl.

about two years, depending upon the size of the child. At this time boys wear dresses made with box plaits from the neck (Fig. 43), with a belt which comes from the side seams or, if preferred, goes entirely around the waist; while girls still wear the baby-dress, gathered in a yoke (Fig. 44). Next comes oftenest some such garment as a

Russian blouse suit for boys, made in various designs. At from three to four years of age, depending on the size and shape of the child and the wish of the parents, the boy is put into trousers, either knickerbockers or the popular sailor costume.

An important matter, with girls just as much as with boys, is that the same precautions to ensure looseness and warmth of the clothing shall be taken at this age as earlier in life. If corsets must finally be worn—as inexorable Fashion still says they must—let the girl in her formative stage defer adopting them, or even corset-waists, just as long as possible. Her whole future well-being may depend upon this and similar early provisions for her health. There is nothing in all this which means that her clothes shall look ugly or ill fitting.

FIG. 45.—Night-drawers with closed feet.

The night-dress of children who have ceased to wear baby clothes consists of a merino shirt, of thickness varying with the season, and of night-drawers which are of Canton flannel or cotton stockinet in winter and muslin or outing flannel in summer. The very frequent tendency which some children have to toss off the night-covering often renders it advisable to provide the drawers with feet, so that the whole body except the head and hands is constantly covered (Fig. 45). A slit at the ankle allows the foot to be pushed through and the stocking to be put on in the morning without exposing the child. Not until well on in later childhood, at least

in winter, should night-gowns be made for the girls, and night-shirts or, still better, pajamas, for the boys.

For out-of-door wear both sexes continue to wear caps until the age of about two years, when boys generally replace them by little hats. The use of a warm hood, or of some other form of head-covering which protects the ears, should certainly be adopted in winter. Warm wraps and coats are needed in winter, their nature depending upon the child's age and sex. The soles of the shoes are gradually increased in thickness as the child grows older, and at about the age of three or four years the part under the heel is made slightly thicker—*i. e.*, has a "spring." The spring is later made somewhat more pronounced, but it is only, as a rule, at about the age of ten or eleven years that actual heels are used. Sometimes boys' shoes are given heels somewhat earlier, in order to make a distinction from the shoes of girls. Leather leggings are very popular for children of three or four years and over. Rubber over-shoes should always be worn if the ground is at all damp. Rubber boots permit the child to play in the snow or on very wet ground. In later childhood mackintoshes serve to protect from rain. Before this time it is better that the child stay in the house in rainy weather. We must never forget the possible danger of contracting cold after the use of waterproof clothing, from the fact that the body becomes damp from the retained perspiration. After the use of rubber boots the feet should be thoroughly dried and the stockings changed.

The following list represents the clothes required for late infancy and early childhood up to the period when trousers are adopted by the boy. More drawers are needed at first than later, on account of the occasional lapses in the recently acquired control over the bladder.

CLOTHING FOR LATE INFANCY AND EARLIEST CHILDHOOD.

Binders (up to two years of age)	4
Shirts	6
Drawers	6 to 12
Stockings	6 to 8 pairs.
Shoes	2 pairs.
Underwaists	4
Flannel skirts with waists attached	4
White skirts	4
Dresses	6 to 12
Night-drawers	4
Sacks	2
Cap or hat	1
Leggings	1 pair.
Coat	1
Mittens or gloves	1 pair.
Rubber shoes	1 pair.

A few very brief comments are necessary regarding the clothing required during sickness. When the child is in bed it should be dressed in night-clothes identical with those usually worn. The garments should be changed night and morning, and be aired and warmed thoroughly before they are used again. There can never exist any necessity of making a child go without changing its clothing for days or weeks for fear it will take cold. If the change is made properly, there is no risk. It is very important that the arms and chest be well covered with a sack of some sort when the child is awake. After it is well enough to be out of bed and to sit in a chair a flannel wrapper and knit or felt shoes are useful. Slippers are often dangerous, as they expose the feet to draughts.

CHAPTER VI.

FEEDING THE BABY.

In this chapter we shall consider what is often one of the most difficult of all the questions of babyhood; the rock upon which many and many a little bark has made shipwreck.

There are practically but two ways to feed an infant—namely, either on human milk at the breast of the mother or of a wet-nurse, or upon an artificially prepared milk diet—and we have the two corresponding classes of the *breast-fed* and the *bottle-fed* baby. Happy are the little ones who belong to the first class, since there is no question whatever that the natural and proper food for infants is human milk. Statistics show beyond doubt that breast-fed babies as a class are larger and healthier than the bottle-fed ones, and that the mortality among them is far less. The most careful preparation cannot possibly make the milk of another animal chemically identical with that of a woman or similar in its effects on the child. It is undoubtedly true that the demands made upon the time of the nursing mother are most exacting, and that nursing is probably much the greatest inconvenience of motherhood. Still, the mother-love should certainly prompt the self-sacrifice.

Let us, then, first consider *breast-feeding*. Many varying directions are given regarding the time when the baby should be first put to the breast. We cannot do better in this respect than treat the child like any other little new-born animal which is not prevented by cast-iron rules from nursing as soon as it feels inclined. The natural instinct of a baby is to suck, and it should be allowed to do this as soon as the mother feels sufficiently rested to permit it, after both she and the child have been

washed and dressed. This practice of early nursing is a good one, for the reason that it tends to ensure thorough contraction of the womb. It is true that there is very little in the breast during the first two or three days. There is usually something, however—a thin, yellowish, sticky fluid looking like poorly-developed milk, and called *colostrum*. This is of a peculiar character, since, besides being of a nourishing nature, it probably has a somewhat purgative action upon the child's bowels; and it is advisable that these be well opened early and the blackish contents (*meconium*) discharged. It is only by about the third day after confinement that the secretion of milk becomes well established.

The early sucking by the child fulfils still other purposes besides those mentioned. It both stimulates the secretion of milk and draws out the nipples into better shape for the baby's future use. If the nipple is somewhat depressed or poorly developed, it is much easier for the child to suck at it while the breast is still flaccid than after it has become full and tense with the contained milk.

Many monthly nurses wish to feed the child during the first day or two of life with sweetened water, gruel, or other substances. This is usually totally unnecessary, and is often harmful. If the child really seems to be ravenously hungry, as shown by the avidity with which it grasps the nipple and the cries which it persistently utters, it may be given a very little cow's milk prepared according to the method to be considered later; but such a necessity rarely arises. Often a little moderately hot water will satisfy the child perfectly. During the first two days of life the infant may be put to the breast from four to six times in the twenty-four hours; after this, during the first four weeks of life, it should be nursed regularly every two hours during the day, and from this

up to the time of weaning every two and a half, and later, every three hours. It should be trained as far as possible to do without nursing at night—from ten in the evening to early in the morning. The advice given on pages 134 and 135 for guidance in the frequency of the feeding of bottle-babies applies equally to those nursed at the breast. Too much stress cannot be laid on the importance of regularity in nursing. No fault is more common and more pernicious than that of suckling a child every time it cries, and simply for the sake of quieting it. The temptation to do this is great, it is true, but the final results are evil, for the baby's digestion is almost sure to suffer, and its disposition to cry to become worse and worse. Moreover, a baby is to a wonderful degree a creature of routine, and when once it becomes a "slave to bad habits" it will make everyone connected with it a slave to itself. It should never be allowed to lie asleep at the breast with the nipple in its mouth, but should be kept awake until it has finished or else be removed entirely. By the time of the next nursing it will be hungry enough to keep awake. If the baby is asleep when the hour for nursing comes, it should be aroused and fed. It will in this way soon learn to wake at the proper time. This waking does not apply to the night nursings after 10 P.M.

It is a great mistake to suppose that every cry that stops temporarily when the breast is given denotes hunger. Often the child is thirsty, and a little water is really what it needs. This advisability of giving the baby water is very commonly forgotten. A nursing infant, although not actually requiring it, may well have water offered to it several times a day, at first from a teaspoon and soon from a glass or a nursing-bottle. In summer-time more water is required, and especially as the baby grows older and solid food is replacing liquid to a considerable extent. The use of the bottle has the advantage that the

baby grows accustomed in this way to its use, and the process of weaning later is rendered easier. Unless the purity of the water is beyond suspicion, it should be boiled and then cooled. So, too, the stopping of a cry by nursing may occur because the entrance of the warm milk into the stomach temporarily relieves pain—only, of course, to increase the indigestion and to give worse colic presently.

The mother also suffers from too frequent nursing, for not only is she then at the mercy of the child's habits, but she is extremely liable to develop cracked nipples as the result of the constant moistening.

The baby while nursing from the left breast should be held on its right side with its head supported by the left arm of the mother. The mother should be propped slightly in bed with a pillow or should lie upon her side. After her convalescence she should lean a little forward while nursing, so that the nipple points somewhat downward toward the child's mouth, and should slightly steady and elevate the breast with the first two fingers of the right hand to keep the weight from pressing upon its nose. If the child nurses too rapidly, the nipple should be withdrawn now and then to prevent its choking and to allow it to breathe. If the milk flows too freely of itself, it may be restrained by pressing the base of the nipple between the fingers and thumb; while if, on the other hand, it does not come quickly enough, and a delicate child seems unable to draw sufficient nourishment, the pressure of the hand upon the breast will aid in expelling it. In nursing from the right breast the position is of course reversed, and the child lies upon its left side. In rare instances, however, it will vomit if in this position while nursing, owing to the pressure of the liver upon the stomach. In such a case it may lie upon its right side with its legs tucked under the mother's right arm.

If there is an abundance of milk, one breast is sufficient for one nursing, and the baby empties it after ten or fifteen minutes, is satisfied, falls asleep, and should at once be removed. The other breast should be reserved for the next nursing. The quantity of milk which a mother secretes during the first weeks of a baby's life is about one pint in twenty-four hours. Later the amount increases as the needs of the child grow greater. Generally the mother at first has more milk than a baby can digest. A kind provision of nature prevents the overfeeding in which a strong baby indulges from doing it any harm, for the stomach simply rejects the over-supply, which comes up just as it went down. It is not a true, forcible vomiting, such as occurs in infants who are ill, but is a simple regurgitation unattended by nausea, and need give the mother no immediate anxiety, provided the milk has no very sour odor and the health seems perfect. At the same time the trouble should be corrected by not allowing the baby to nurse quite so long or so often.

In this connection we must consider the way in which a nursing mother ought to conduct her life, since upon this the health of the baby will depend. Her diet is a matter of much importance. What she shall eat during the time she is confined to bed will be carefully ordered by her physician. It is generally customary to alter the diet to some degree, either in quantity or in quality, since the confinement to bed may diminish somewhat the power of digestion. This is especially true of the first couple of days. After the mother is up and about she becomes her own mistress in this matter, and must determine for herself what is best for her. She should use every means to preserve her digestion in the very best condition by observing regularity in the time of

meals, by eating slowly and masticating thoroughly, and by consuming only those things which are digestible and nutritious.

There is a commonly prevailing notion that various substances must be avoided because they will give the baby colic by altering the milk. This is true only to a very limited extent, and generally only in so far as the mother's digestion is disturbed by what she has taken; for it is certain that indigestion in the mother, by whatever means produced, is liable to be followed by indigestion in the child. It may sometimes happen, however, that raw fruit or acid substances eaten by the mother may, without affecting her digestion at all, in some way alter her milk and disagree with the baby; but this is rather the exception than the rule. It is also true that such articles of diet as onions, turnips, cauliflower, and cabbage, which have very distinct odors and tastes, are sometimes capable of imparting an unpleasant taste to the mother's milk, just as cow's milk may taste disagreeably of garlic. Most mothers, however, who have perfect digestion can eat nearly everything digestible without fear of affecting the baby.

It is certainly true that there are drugs which, when taken by the mother, enter her milk, and it would sometimes be possible for physicians to treat the child in this way. This is true of some of the purgative drugs and of certain others, but even in the case of medicines, as with foods, most mothers may be, to all intents, free from anxiety regarding the effect on the baby of any medicine that may be prescribed for her.

With regard to the use of stimulants, the nursing mother should follow her former habit of life if this has been correct and her health seems good. If she is delicate or weak, she may find stimulants of service, but the

advice of a physician had better be obtained in any case. Large quantities of alcoholic stimulants taken by the mother may do the baby much harm.

Not infrequently there is an insufficient supply of milk, and the question arises whether the amount can be increased in any way. Sometimes the giving of both breasts at a nursing is then of advantage. The drinking of large quantities of cow's milk, the use of various milk foods, soups, and perhaps of malted liquor in some form, may be of advantage. One of the thinner extracts of malt is often useful. It must be remembered, however, that increasing the secretion of milk does not necessarily increase its nourishing power, and that to take a large amount of liquid nourishment is sometimes only to practise a deception upon the baby. It may be merely following the example of the milkman who invokes the aid of the well-pump; for, although the quantity secreted may be larger, the milk may be more watery and the actual amount of nourishment in twenty-four hours may be just the same as before. Still, much may often be done to alter the character of the milk, as we shall see presently.

Equally important with proper diet is regular exercise and the enjoyment of fresh air, either on foot or in a carriage. Late hours must be avoided, as must all sources of worry, anxiety, and nervous excitement. It is a not infrequent occurrence for the milk secreted shortly after a mother has experienced fright, violent anger, or other very powerful emotion to act as an intense poison to the baby. If a mother has been subjected to any such influence, it is better to empty the breast with the pump and to avoid nursing for a number of hours, substituting artificially prepared milk for the time being.

The ability of the mother to nurse her child often depends upon the condition of her nipples. They should

have been attended to during pregnancy, in the manner already described in Chapter I. In spite of all efforts, however, the birth of the child may find the nipples unfit for nursing. Their shape may be such that the baby can obtain no satisfactory hold, and in such a case an artificial nipple must be tried. There are many varieties of these, but those of the simplest construction should be chosen, as it is very necessary to keep them perfectly clean by frequent boiling. One of the best consists of a glass base upon which is fitted a detachable rubber teat (Fig. 46). Such an apparatus may prove satisfactory, and the effort to use it should always be made, but very frequently a poorly-developed nipple will make it necessary to abandon nursing.

FIG. 46.—Artificial nipple.

To keep the nipples in good condition a mother should observe the regular times for nursing as already referred to, and should invariably and immediately after nursing dry the nipples gently and thoroughly with a soft cloth, and then, for the first week or two, smear them with a little sweet oil.

If the nipple becomes slightly raw or sore, it may after being dried have a special bismuth preparation applied and allowed to remain (Appendix, 78). It is important, too, to protect it carefully from any friction of the clothing, possibly by the use of some form of nipple-shield, if the doctor sanctions it (Fig. 2, p. 27). Before nursing again the bismuth application may be wiped away gently, but there is no need to do this very thoroughly, as it is not injurious to the child if it is swallowed. The use of an artificial nipple for a few days is to be recommended should the nipple be even only slightly sore.

Should nursing become actually painful, a physician ought to be consulted immediately, for it is much easier to treat the fissures in the early stages than after they have become deep. If they are neglected, the pain of nursing may become simply unendurable.

Sometimes the flow of milk is so great that even a strong baby cannot manage to take it all, and a constant hard distention of the breast, usually described as "caked breast" or "milk cake," results. Unless this is promptly relieved there is great danger of an abscess forming. To prevent or relieve caking in such cases the breast requires long-continued and gentle but firm rubbing with warm sweet oil from the circumference toward the nipple, and the occasional application of the breast-pump (p. 27) to supplement the sucking by the child. The mother must on no account fail to consult her physician at once regarding the difficulty, and should not depend solely on the ministrations of the monthly nurse, as the matter is quite too serious for this.

Eventually the baby must be weaned—that is, cease entirely to receive human milk, and be placed on a diet of another nature. The method of doing this and the age at which it shall be done vary somewhat with circumstances. Some physicians advise that the baby begin to receive a small amount of artificial food when it reaches the age of five or six months, or even earlier than this, on the ground that its dependence upon mother's milk is thus rendered less absolute, and that it will not be subjected to the dangers which sudden weaning entails should the milk of the mother rapidly dry up. Although there is a degree of truth in this, yet it seems like guarding against a possible danger by incurring a very certain one—that of injuring the child's digestion; for experience shows that there are numberless instances

of severe illness, and even of death, which have resulted from the early effort to replace mother's milk by cow's milk or other food, no matter how carefully prepared.

Yet there is a mother's side to the question, for there is no doubt that the feeding of her baby month after month from the breast alone renders her life very much confined and is a great drain upon her system, and in many instances her health, not only immediate but future, cannot endure it. In such cases, even when there is an abundance of breast-milk, the plan of giving one or possibly two bottles a day is to be thoughtfully considered. The substitution, however, should only be tried with the advice and under the supervision of the family physician. Certainly the safest course for a thriving baby is that of feeding it solely from the breast until the age for weaning comes.

So, too, if the baby ceases to grow at a proper rate, and it is proven that the breast-milk is insufficient in quantity or quality, the doctor may decide to combine artificial feeding with nursing.

Ordinarily, weaning should begin at about the age of ten or eleven months. Longer nursing than this is generally too wearing upon the mother, and is also bad for the child, whose health is very likely to be impaired as a result of the breast-milk becoming thin and poor. Of course, the exact age to wean must depend on circumstances. If the mother remain perfectly strong and the baby continue in the very best condition, it may be nursed until it is a year old, while the reverse of this may make early weaning necessary. Another very important matter is the season of the year. It is very bad policy to begin to wean a child at the height of hot summer weather if it can be avoided in any way. It is certainly better to defer it until autumn, or to accustom the infant to bottle food, to a certain extent, in the late spring.

Weaning is best done gradually if possible. There is no foundation for the belief that there is harm in "mixed feeding"—*i. e.* the combination of breast- and bottle-feeding. At first but one bottle a day is given, the child being nursed at its other meals, but as time goes on the bottles are gradually increased in number and strength, while the frequency of suckling is correspondingly diminished, until by the time about a month has elapsed the breast has been withdrawn entirely. This plan gives the child time to become accustomed to its new diet. The first bottles are weaker than human milk, and would be insufficient alone to support the child. The strength is gradually increased with the number given, until by the age of a year the infant takes cow's milk only a little diluted.

Sometimes it is necessary to wean rapidly. One of the chief causes of this is the refusal of the baby to take the bottle at all. Patience and persistence will generally overcome this, or it may be that the child will take food from a spoon or a cup. Should it still refuse, the only way open is to withdraw the breast entirely and at once until hunger forces the child to eat. With sudden weaning, or sometimes even with the gradual process, the mother has much trouble from the distention of her breasts with milk, and must employ care lest an abscess result. She should take as little liquid of any kind as possible, whether water, tea, soup, milk, or whatever it may be. She should also take a gentle purgative, such as citrate of magnesia or a mineral water, keep the breasts supported by a broad band going beneath them and over the shoulders, partially empty them occasionally with the breast-pump if the distention is painful, and prevent caking by diligently rubbing them with warm oil. Any other treatment, such as the application of ointments, had better be left to the family physician.

Early weaning may be rendered necessary in differ-

ent ways. If the mother is suffering from the drain of nursing or from great debility, consumption, or other exhausting ailment, or if she develop any severe acute disease, such as typhoid fever, pneumonia, or the like, nursing the child is quite out of the question. It is very commonly believed that the return of the menstrual period makes nursing improper. Although this occurrence often does render the milk unfit for the child, yet this is not an invariable rule, and the mother should do nothing precipitately in the matter. After the occurrence of one monthly period there may be no reappearance of it for several months, and weaning would have been entirely unnecessary. Each case is a rule to itself, and only the effect upon the mother and baby can settle the question, even if the periods have returned regularly.

Should the mother become pregnant again, the child should be weaned, for it is too great a drain upon her to sustain both the one present and the one to come.

Sometimes there is a great falling off in the quantity or quality of the milk, which cannot be remedied in any way, or there may be an entire and even early cessation of the flow. Again, the breast-milk may be richer than the child can digest. Sometimes excessively painful fissures occurring in both breasts and refusing to heal, or the persistence of obstinately retracted nipples, may render nursing impossible, even with the aid of an artificial nipple. Abscess of the breast prohibits nursing from the one that is affected.

Before breast-feeding is abandoned on account of any defect in the amount or quality of the milk the mother should not fail to make sure that the trouble really exists, or that it cannot be remedied. The only accurate method of determining the character of the milk is, of course, to have a chemical analysis made of it. But even without this the mother may be able to form some idea

of the nature of the difficulty. This is to be done partly by observation of the baby, partly by direct study of the milk with the aid of a creamometer and a specific gravity apparatus, such as are described and their employment explained on page 140. Those for use with human milk are usually made especially small, in order that less milk shall be required.

First, then, we must remember that if a baby is growing at the proper rate, it is getting enough to eat. Any crying is probably due to some other cause than hunger, even although the child may not seem satisfied. If, however, it is not growing properly, and there is no diarrhœa, or vomiting, or other ailment to account for this, it is probable that the milk either is not rich enough, or that it is insufficient in amount. If the child tugs long and hungrily at the breast, and is unwilling to cease sucking after it should have finished, or if, perhaps, after a period of nursing, it drops the nipple with a dissatisfied cry, it is very likely that the milk is insufficient in quantity. This is particularly so if the breasts are flabby before nursing and seem to be quite empty after it. If, on the other hand, the milk is bluish and pale even though very abundant, and if the child seems temporarily satisfied after nursing and the breasts are not emptied, it is probable that the richness of the milk is deficient.

By looking at the analytical table on page 137 we see the ingredients of which milk consists. It is the fat and the proteids (see page 137) which are the ones especially liable to vary in quantity. The amount of sugar may be ignored at present, as it is less variable. Milk deficient in richness may lack the proper proportion of either or both of these two ingredients. Which of them is at fault we can determine to some degree by direct study of the milk. In getting the milk for examination the baby

should be allowed to nurse for a couple of minutes, the nipple should then be washed and dried carefully, and a portion (about one or two tablespoonfuls) should then be drawn by the breast-pump. It should be put into a bottle and kept directly on the ice. At later nursings similar small amounts may be procured and added to the first. The milk thus obtained represents the average of about the middle of the nursings.

Average human milk should separate in the creamometer about 7 per cent. of cream, which is equivalent to about 4 per cent. of fat. By determining the percentage of cream with this instrument and comparing it with the specific gravity we can, as we shall see presently, estimate the amount of proteids present, and decide whether the lack of richness is in fat or in proteids, or in both (see Table, page 130).

But very often the necessity of weaning threatens on account of an excess of richness of the milk. An excess in the actual quantity of the milk may show itself by regurgitation (see pages 130 and 271) and often by the presence of large quantities of curds in the stools. This excess is generally easily controlled by removing the child from the breast before it has taken too much, or by compressing the nipple during the nursing in order to make the milk flow more slowly. Too great richness of the milk is not so easily managed. If there is too much fat present, there may be a tendency to vomit rancid-smelling material, or to suffer from diarrhœa. The test with the creamometer will show the actual amount of cream. By far the more frequent and troublesome fault, however, is an excess of the proteids. This usually shows itself by vomiting of curdy material, or, still oftener, by the constant presence of a large amount of white, curdy lumps in the stools. Except by the ex-

amination of the milk, this condition can scarcely be distinguished from the disordered stools dependent upon an excessive quantity of milk taken. Colic, too, is very common, and all the symptoms of indigestion may finally grow so prominent that weaning may seem necessary. Again by the use of the creamometer we may determine the amount of cream present, and then, by comparing this with the specific gravity, we can judge whether the proteids are in excess.

The following very useful table has been devised (Holt), by consulting which the mother may be aided in making, with a little practice, an approximate analysis of her breast-milk. The procedure is quite simple (p. 139). The specific gravity of the sample of milk is obtained at the ordinary room-temperature of 70° F. The cream percentage is read off after the milk has stood in the creamometer for twenty-four hours. If these two are now compared, as found in the second and third columns of the table, the amount of proteids corresponding to these will be shown in the fourth column. At the same time it is certainly better, if possible, to leave this analysis to some one experienced in such matters.

APPROXIMATE ANALYSIS OF THE BREAST-MILK.

	Specific Gravity. 70° Fahr.	Cream, Twenty-four Hours.	Proteids.
Average.	1031.	7 per cent.	1.5 per cent.
Normal variations.	1028–1029.	8–12 per cent.	Normal. (Rich milk.)
" "	1032–1033.	5–6 per cent.	" (Fair milk.)
Abnormal "	Low (below 1028).	High (above 10 per cent.).	" or slightly below.
" "	" " "	Normal (5–10 per cent.).	Low. (Poor milk.)
" "	" " "	Low (below 5 per cent.).	Very low. (Very poor milk.)
" "	High (above 1033).	High (above 10 per cent.).	" high. (Very rich milk.)
" "	" " "	Normal (5–10 per cent.).	High. (Rich milk.)
" "	" " "	Low (below 5 per cent.).	Normal, or nearly so.

Supposing, now, that we have found some defect in the quantity or quality of the breast-milk. The ques-

tion arising is whether something cannot be done to correct this, instead of at once subjecting the baby to the trials of artificial feeding. Modification of the amount or kind of food taken, and of the method of living and the frequency of nursing, exerts a powerful influence upon the composition of the milk. Consequently much may often be accomplished by following certain rules, which are formulated in the following table (Rotch).

RULES FOR MODIFYING BREAST-MILK.

To increase the total quantity .	Increase the liquids in the diet.
To decrease the total quantity .	Decrease the liquids in the diet.
To increase the total solids . .	Shorten nursing-intervals; decrease exercise; decrease the liquids in the diet.
To decrease the total solids . .	Lengthen nursing-intervals; increase exercise; increase the liquids in the diet.
To increase the fat	Increase the meat in the diet.
To decrease the fat	Decrease the meat in the diet.
To increase the proteids	Decrease the exercise.
To decrease the proteids	Increase the exercise to the point of fatigue.

The expression "total solids" means the total amount of fat, proteids, sugar, and salts of the milk.

Should the mother still find it necessary to abandon nursing, she does not necessarily have to wean the baby, since she may employ a wet-nurse. There is no question that the milk of a good wet-nurse is very greatly to be preferred to bottle-feeding. At the same time there are many and weighty objections to the employment of a wet-nurse. Not only is it very difficult to obtain one who even seems likely to be suitable, but the position of

the nurse at once makes her the tyrant of the household. She frequently proves to be altogether unreliable, will not take the care of herself which is necessary to the preservation of the quality of her milk, and at any moment may become dissatisfied and abandon her position, perhaps leaving the last state of the baby considerably worse than the first. Nevertheless, in the case of a delicate child or the failure of artificial food to agree, the engaging of a wet-nurse often is the baby's only chance for life. I have often seen really remarkable results quickly follow the employment of a wet-nurse for a child who had failed to improve at all on artificial feeding. The selection of the wet-nurse we can best discuss when considering the subject of The Baby's Nurses, in Chapter IX.

This brings us to the consideration of the very complicated subject of *artificial feeding*, often one of the most perplexing problems which can present itself to the combined study of mother and physician. In the effort to solve it too careful attention cannot be paid to the smallest and apparently most trifling details, for, although many a baby seems to have a totally insensitive stomach and will thrive on nearly anything, many another cannot keep in health unless the food suits it exactly. In endeavoring to feed a baby properly we must bear in mind three important factors, already referred to to some extent in discussing the means of modifying the breast-milk:

(1) The quantity of the food;

(2) The quality of the food;

(3) The individual peculiarities of the child.

(1) **The Quantity of the Food.**—One of the most frequent mistakes made in feeding a baby is that of giving it a much greater quantity of food than it can possibly

assimilate, with the result that it either vomits it or passes it through the bowels in an undigested state. A new-born baby's stomach holds without distention only about one ounce (two tablespoonfuls) or less. The accompanying illustration (Fig. 47) represents the actual size of the stomach at birth. It shows perhaps better than in any other way how small the infant stomach really is. How foolish, then, to feed a new-born child

FIG. 47.—Stomach of infant at birth (natural size).

from a full-sized nursing bottle, and to allow it to gorge itself with all it will take! Careful study of the size of the stomach at different ages in infancy, and of the quantity of milk drawn from the breast by a nursing baby, has led to pretty uniform conclusions among physicians regarding the amount of nourishment which may be suitably given to a child at different periods of its life. The accompanying table, taken with slight modifications from an excellent article by Dr. Rotch, shows the amount proper at each feeding, the number of feedings, and the total quantity required in twenty-four hours. As has been stated in a previous chapter, this and the

following tables apply as well to children who are fed at the breast, and may be taken as a guide for the frequency of and hours for nursing them.

GENERAL RULES FOR FEEDING.

Age.	Intervals of feeding.	Number of feedings in 24 hours.	Number of feedings at night after 10 P.M. (between 10 and 7).	Amount at each feeding.	Total amount in 24 hours.
1 to 4 weeks.	2 hours.	10	2	1 to 2 ounces.	10 to 20 ounces.
4 weeks to 3 months.	2½ hours.	8	1	2½ to 4 ounces.	20 to 32 ounces.
3 months to 4 or 5 months.	3 hours.	7	1	4 to 5 ounces.	28 to 35 ounces.
4 or 5 months to 1 year.	3 hours.	6	0	5 to 8 ounces.	30 to 48 ounces.

As already stated on p. 117, during the first two days of the first month the child is not fed more than from four to six times in twenty-four hours. Sometimes it is better after the ninth or tenth month to lengthen the intervals to three and a half hours, making five feedings in twenty-four hours, and giving from 8 to 10 ounces at a feeding.

The above table is intended to apply only to children of the normal lengths and weights corresponding to their ages, and is, like all rules, subject to exceptions. It is important that the size of a child be constantly borne in mind, since it is often more of a criterion than the age. It is manifestly absurd to expect a baby twice as large as another of the same age to be contented with the amount of food which satisfies the smaller one. When, therefore, a baby has largely fallen behind in growth, we must often ignore its age to a great extent, and give to it an amount of nourishment not much in excess of that suit-

able to the age to which its actual size and weight correspond. This age may be determined by consulting the table on page 53. On the other hand, some children take and digest much more food than others of equal age and equal size. In such cases it is safe to exceed the amount given in the table if we are quite sure the food is being digested.

The following table gives in convenient form the hours for feeding a child under one year of age, whether on the bottle or at the breast. It is made to correspond, as far as possible, with the table just given, and is so arranged that feeding does not interfere with the hours for the morning and afternoon naps.

HOURS FOR FEEDING.

1 to 4 weeks.	4 weeks to 3 months.	3 months to 4 or 5 months.	4 or 5 months to 1 year.
7 A.M.	7 A.M.	7 A.M.	7 A.M.
9 "	9.30 "	10 "	10 "
11 "	12 M.	1 P.M.	1 P.M.
1 P.M.	2.30 P.M.	4 "	4 "
3 "	5 "	7 "	7 "
5 "	7.30 "	10 "	10 "
7 "	10 "	3 A.M.	
9 "	3 A.M.		
12 "			
4 A.M.			

This table, like the preceding, is, of course, intended only as a guide, not as a hard-and-fast rule. It is open to modification depending upon various factors. It is often better to begin the day's feeding at six instead of seven. This advances all the feedings one hour, and makes the early evening nursing less likely to interfere with the hour for going to bed. Some children with healthy appetites do not require or desire nursing so frequently. If an interval of three and a half or four hours

is adopted at the age of nine or ten months, the hours for feeding will read 7 and 10.30 A.M., and 2, 6, and 9 P.M. If the baby is found generally to be asleep at one or more of the feeding hours, it should either be awakened and fed, or some lasting alteration in the schedule made. Usually the child soon learns to wake of its own accord at the proper time. Again, if a child wakens hungry every night at a time different from that given in the table, it is better to feed it regularly then than to allow it to arouse itself thoroughly by crying. A very important factor, too, especially in later infancy, is the convenience of the mother, and the hours for meals for the household in general. Regularity is, after all, the principal matter.

(2) **The Quality of the Food.**—Regarding the character of food to be given to a child—that is, its *quality*—it is evident that the more closely the food resembles mother's milk, the more likely it is to agree with the child. It is a common custom to alter the composition of a cow's-milk mixture according to the increasing age of the child. To make this a routine procedure, in the case of healthy and flourishing babies, is unnecessary and harmful. The mother's milk, if it keeps of good quality, does not vary very materially during the many months of suckling, and consequently no necessity exists for any change in the composition of the artificial food if we can once get it to simulate human milk and to be well digested. It is perfectly true, owing to the insurmountable differences from human milk, that many infants do need progressive increase in the strength of the mixture as they grow older. Many, on the other hand, are injured by attempting to give stronger food. The whole matter is an individual one. If a child ceases to grow properly yet has no illness, stronger food is usually needed. Just

how strong, the baby's physician must determine. The milk both of the ass and of the mare is considerably closer in composition to human milk than is that of other domestic animals. That of the goat is more like that of the cow. It is rare, however, that either of the first two milks can be obtained, and they are generally expensive; and since all of them need, in any case, to be prepared in various ways before using, cow's milk becomes the only baby-food usually practicable. That it is, however, much unlike woman's milk in some particulars can be seen by consulting the following table, which gives approximate analyses of the two fluids.

Woman's Milk.		Cow's Milk.	
Reaction	Alkaline	Reaction	Acid.
Bacteria	Absent	Bacteria	Present.
Water	87–88%	Water	86–87%
Total solids	12–13%	Total solids	13–14%
Fat	3.5–4%	Fat	4%
Proteids	1–1.5%	Proteids	3.5–4%
Milk-sugar	6.5–7%	Milk-sugar	4.5%
Ash	0.2%	Ash	0.7%

The specific gravity of woman's milk does not differ materially from that of cow's milk, the normal range being from 1028 to 1033. Cow's milk is, as the table shows, slightly acid in reaction in the condition in which it is served by the milkman. As drawn from the cow it ought to be alkaline, but it very quickly becomes acid to litmus-paper, owing to faults in the milking and exposure to air. When we consult the table we are struck by the fact that woman's milk has the same percentage of fat as cow's milk, that it is almost twice as rich in sugar, and that it has only one-quarter as much of the "proteids." By this last term is designated that nitrogenous portion of the milk upon which the production of new tissue in

the baby largely depends. Prominent among the milk proteids is the casein—namely, the part which forms the curd. This casein is particularly abundant in cow's milk, and it is this ingredient especially which renders the undiluted milk of the cow unfit for the baby. Now, if we dilute cow's milk with water sufficiently to render the percentage of proteids identical with that of human milk, we shall meantime lower the amount of sugar and of fat, and the milk will be very weak in these ingredients. The only method by which to overcome the difficulty is to make up the deficiency after dilution by adding more cream and sugar. Besides this, we must add to the mixture a small quantity of an alkali, such as lime-water, in order to neutralize the slight acidity, and especially because it aids in the digestive process.

Another characteristic of cow's milk is the fact that the curd which forms in it is much tougher and firmer than that which is seen in woman's milk. This may be due to some chemical peculiarity of the casein, but it seems more likely to be dependent chiefly upon the greater amount of it present. Casein is not the only proteid of milk. Another is "lactalbumin," which is more abundant in human milk as compared with cow's milk, and is much easier of digestion than the casein. The fats of the two varieties of milk are also not quite identical in composition, that of the cow being less digestible. It is these and probably other little understood differences in the two sorts of milk which account for the difficulty many children experience in thriving upon anything but human milk.

It has been claimed, too, that boiling causes the formation of a tougher curd, and it is probable that it does alter the milk in some way which may render it rather more difficult to digest.

Although there are numbers of infant's foods on the

market, as a rule by far the safest and most accurate substitute for mother's milk can be prepared at home. To make the mixture properly it is of primary importance that the several ingredients themselves be of proper quality. The cow's milk should be unskimmed and should be procured from a reliable dealer whose cows are healthy and carefully kept, and are not fed upon swill or other refuse material. It is of no advantage to have the milk from a single cow; it is, in fact, of distinct disadvantage, for the great difference which exists between the milks of different cows makes it impossible to prepare a proper imitation of mother's milk according to any fixed rule unless we should have the individual cow's milk analyzed in order to determine exactly what its strength is. Besides this, the milk of any cow is subject to variations from time to time, depending upon the nature of the food given it, the health of the animal, and other factors. It is therefore preferable to use mixed herd milk—not solely Jersey, which is too rich—since this gives a much more uniform basis for the food.

Every possible precaution should be taken to ensure absolute cleanliness of the building where the milking is done—which should not be the stable—the udder, the milk-pail, and the hands during milking, and the milk should then be cooled rapidly and at once sealed in jars. We can judge to a large extent of the quality of the milk by its appearance. It should be of a yellowish-white color, without any bluish tinge. To determine still more accurately its quality, an instrument called a *lactometer* is employed, although the simplest apparatus is the urinometer, used by physicians for testing urine. This latter apparatus, which may be procured through any druggist, consists of a small glass cylindrical tube and a specific-gravity glass, as shown in the illustration (Fig. 48). The tube should be partially filled with milk of the usual

room-temperature (70° F.) and the glass be floated in it. The specific gravity of the milk—that is, its density as compared with water—may then be read off on the scale on the stem of the apparatus, looking at the bottom, not the edge, of the curved surface of the liquid. Taking the density of water as 1000, that of cow's milk should average 1029 to 1030, with a normal range of 1028 to 1033. Yet the apparatus is of limited value only, for under certain circumstances milk which is poor may show a specific gravity identical with that of milk which is rich. All that we can say here is, that if the specific gravity is less than 1028 or more than 1033, the milk is suspicious. Of course, even a normal specific gravity, taken by itself, is not proof that the milk is good.

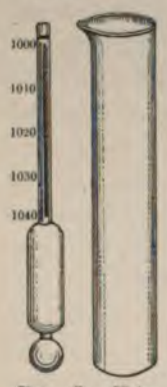

FIG. 48.—Urinometer.

FIG. 49.—Creamometer.

So, too, there is no accurate instrument for household use which shows the richness of the milk in cream. An inexpensive apparatus called a *creamometer* or *cream gauge* is sold in the instrument-shops and is often recommended. It consists of a cylindrical tube, all, or the upper part, of which is graduated. The milk is allowed to stand in this, carefully corked, for twenty-four hours, at about 70° Fahr., until the cream rises, and the thickness of the layer of the latter is then read off on the scale (Fig. 49) Theoretically, the cream in the apparatus should measure $\frac{1}{8}$ or $\frac{1}{10}$ of the total height of the column. The trouble with the creamometer, however, is that some milk, even though rich, parts with the cream very slowly and imperfectly, while some poor milk allows nearly all of it to go to the surface. The results with the appa-

ratus are consequently very misleading, for the poor milk may seem to have more cream than the rich. I know, in fact, of no way for the mother to determine the amount of cream, except roughly by the color and richness in appearance of the milk. Where the milk seems even suspicious the milkman should be changed. In cities it is easy to have an analysis of the milk made by a chemist. The use of the creamometer for testing human milk is rather more satisfactory. It has already been described on page 130.

There is one test which we can always apply—namely, that for acidity. A strip of blue litmus-paper dipped part way into the milk will turn faintly red if this is acid, as it nearly always is when delivered by the milkman. The milk should be put in the tube of the urinometer, and the paper examined through the glass while still in the milk. If, after the mixing with lime-water or soda-solution and the sterilizing, presently to be described, we again find that blue litmus-paper turns red, we know that the milk is becoming sour and is unfit for use.

Milk is often artificially colored to give it a rich creamy appearance. The substance oftenest used for this purpose is annatto. It may be detected by mixing a pinch of baking-soda with a couple of tablespoonfuls of the milk, inserting one-half of a strip of filter-paper in the fluid, and allowing it to remain over night. Annatto will give a distinct orange tint to the immersed paper.

Various substances, such as boric acid, salicylic acid, and formaldehyde, are often used by dealers to preserve the milk. As the mother is unable to discover the adulteration, she is only made safe by choosing some entirely reliable dairy, or by having the milk examined by a chemist.

The choice of the cream which is to be added in making the baby's food is of importance, since it varies

greatly in richness. To be accurate a chemical analysis is needed. For practical purposes it is chiefly important to consider how the cream is obtained—whether by skimming or by a centrifugal machine such as is used in the large dairies. The thinner centrifugal cream, about as thin as the machine makes it, is to be preferred. It contains about 20 per cent. of fat, while the average cream obtained by skimming possesses about 16 per cent. of fat. It is better to obtain the centrifugal cream when possible, as its richness is more uniform, and, besides this, it is not so apt to have undergone changes as a result of the long standing to which ordinary cream is subjected. When skimmed cream must be used, instructions should be given to the dairyman that the milk stand always the same number of hours, and at the same temperature, before skimming, and that it always be skimmed by the same person. In some of our larger cities a cream of a guaranteed percentage strength in fat can be obtained, and renders the preparation of the food very satisfactory. The mother may, if she wishes, "set" the cream herself, dipping or syphoning it off as described for "top milk" (p. 145). This is often the best plan where definite percentage cream cannot be obtained. The amount of cream used in preparing the bottle will depend entirely upon its percentage of fat, since the richer it is, the less, of course, will be required. Very often the quantity can be determined solely by experience in feeding the child. As in the case of milk, it is better that the cream come from a herd rather than from one cow.

Although ordinary sugar (cane-sugar) may be used to sweeten the baby's food, it is better to employ milk-sugar, since this is the variety naturally present in milk. Cane-sugar answers just as well for sweetening, but it is probable that the milk-sugar serves some other purpose than this merely. Should it be desired for any reason to

use cane-sugar, it is important to remember that it has a greater sweetening power than milk-sugar, and should be used in about half the amount.

Some physicians recommend that a pinch of salt be added to the mixture in order to make up for the amount naturally in the milk before the dilution. The addition certainly does no harm, although it is not an essential.

We are now ready to examine the methods of mixing our ingredients in order to produce a suitable imitation of human milk. Various mixtures have been proposed, many of them excellent, many very unsatisfactory. The following formula produces a milk mixture the proportions of which simulate fairly closely those of human milk:

FORMULA FOR MILK MIXTURE.

Milk	2 oz.;
Cream, skimmed (16 per cent. fat)	1½ oz.;
Lime-water	½ oz.;
Milk-sugar	1 measure;
Water, sufficient to make	8 oz.

The amount of cream varies with its richness, as indicated in the formula. Lime-water is the best alkali for use in the food, unless the mixture is to be sterilized at a high temperature, in which case, for reasons which we shall consider presently, a solution of bicarbonate of soda may well be substituted for it. This soda-solution is of the strength of 1 grain of bicarbonate of soda in a half ounce of water. It will keep indefinitely. A half dozen or more packages, each containing 1 drachm of the soda, may be obtained from a druggist at small cost. One of these dissolved in a quart of water forms a solution of the proper strength, one tablespoonful of it equalling in alkalinity one tablespoonful of lime-water. It should be kept in a bottle, well corked.

To save expense, the milk-sugar should be bought several pounds at a time, and from a wholesale druggist. The required amount may be measured out as needed. At my suggestion, there has been made and offered for sale a small tin measure[1] holding half an ounce of sugar

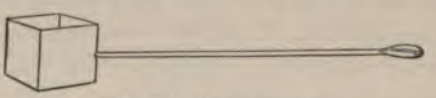

FIG. 50.—Sugar-measure.

(Fig. 50). The measure should be filled by pouring the sugar into it until it is heaped. It should then be tapped twice against the table to settle the contents slightly, and the excess scraped off with a knife. The sugar may then be dissolved in the amount of water which is to be used for the milk mixture for the day. Heat may be used if it does not dissolve readily. The solution should be strained through cheesecloth or raw cotton if it is not entirely clear. A less accurate method of measuring the sugar is with a tablespoon filled in the same manner. Three and one-half level tablespoonfuls equal about one ounce.

Some physicians advise having a stock "sugar solution" of a certain strength to be used in making the mixtures. This has to be made very frequently, as it will not keep well.

As it is often such a difficult matter to obtain satisfactory cream we may, in place of the ordinary cream as sold, use "*top-milk*," as it is called. This may be obtained as follows: Have made a syphon—a U-shaped tube—from a piece of glass tubing, letting the short arm be about eight and the long arm about sixteen inches long. Procure in the morning one quart of milk delivered

[1] The measure may be obtained from Blair and Ogilby, Nineteenth and Chestnut Streets, Philadelphia, at a cost of 35 cents.

in the ordinary quart milk jars. If the cream has already separated with a sharply defined layer, proceed at once. If it has not, allow the jar to stand on ice for six hours. If the milk is not delivered in jars it should be poured into one and allowed to stand as described. At the end of this time remove the jar carefully without shaking, fill the syphon with boiled water (*not* by sucking the water into it), close the longer arm with the finger, in sert the short arm gently down to the bottom of the jar, remove the finger, and syphon off all but eight ounces of the milk. This milk which is left is the "top-milk."

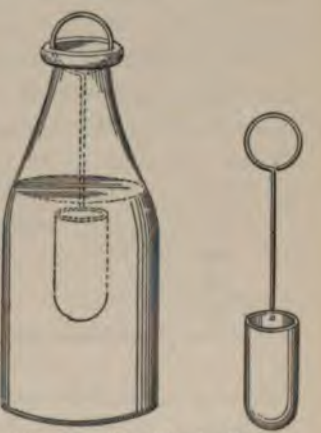

FIG. 51.—The Chapin dipper.

A more convenient method is the removal by a special dipper (Fig. 51), made for the purpose, and holding one fluid-ounce.[1] The milk is allowed to stand in the quart jar as before. The top layer of cream is then skimmed off with a spoon and put into the dipper. As soon as enough is taken to prevent the milk spilling over, the dipper is pushed slowly down until the cream—*i. e.*, the top-milk—flows in and fills it. Eight dipperfuls give eight ounces of top-milk.

Still another method is that of carefully pouring off the number of ounces desired. This gives a top-milk a trifle less strong than with the other methods. The result is also less accurate.

[1] The Chapin dipper can be obtained from druggists, or from the Cereo Company, Tappan, N. Y., at a cost of from 10 to 20 cents, according to the material of which it is made.

It is by no means necessary always to obtain eight ounces. Four, six, ten, or more ounces may be removed, according to the requirements of the child. Of course, such changes alter completely the strength of the milk mixture, since the more milk is dipped out the weaker this is in fat. The remaining portion of the quart of milk is called "bottom-milk," and contains almost no fat. The addition of some of this to the mixture may be required.

The top-milk is really a cream, and we may use it in the following formula, which makes a mixture of about the same strength as that of the formula just given :

TOP-MILK MIXTURE.

Top-milk (upper eight ounces)	2½ oz.;
Bottom-milk	1 oz.;
Lime-water	½ oz.;
Milk-sugar	1 measure;
Water, sufficient to make	8 oz.

The jar, lid, syphon or dipper, and bottles should be washed or, preferably, boiled daily before using. If the syphon is used, a series of lines may be filed on the jar, showing the level at which different amounts in ounces still remain in it. The use of the dipper does away with the necessity of this.

The two formulæ given are intended for the mother's instruction only in so far that she may see in actual quantities about what the comparative strength of human milk is. She is strongly urged *on no account to use them without medical advice*. Although they give mixtures which resemble human milk almost as closely as we can make them, yet it by no means follows that food so prepared is at all what her infant needs. It is well understood that very young infants constantly require at

first a milk mixture which is much weaker than the natural human milk would have been. Later many of them need a formula much stronger than those given. In other cases various peculiarities of the child make certain special milk mixtures necessary. Much depends on the general health and the rate of growth; less on the age. In fact, of recent years physicians have been learning more and more the folly of trying to feed all infants by one prescribed rule based merely on the infant's age. They are endeavoring now to calculate accurately the actual percentage of fat, proteids, and sugar which each individual baby needs. To do this is generally beyond the power of the mother, and the problem of the baby's feeding should always be referred to the baby's physician. (For further details on the preparation of various milk mixtures, see Second Appendix, p. 425).

Having determined the proper ingredients for the milk mixture, and their amounts, the next thing to do is to put them together in the proper manner. The subject of sterilization is an important one in this connection. Mother's milk as drawn from the breast has been found to be entirely or nearly free from those microscopic germs of decomposition which are the cause of souring and other alterations of the milk. Cow's milk as it comes from the udder should be equally free, but through lack of cleanliness in milking, or even by exposure to the air during the delay which must necessarily occur before it reaches the baby, it becomes infected with quite enough of the germs to produce the poisonous changes which have killed so many infants. The fact that milk appears perfectly sweet is no criterion, for if the germs are already in it the harmful changes may take place even after the baby has had its meal. Moreover, by far the most harmful germs are not those which betray

themselves by the souring of the milk. As it is generally impossible to procure cow's milk sufficiently free from the germs, the only method is to sterilize the milk—that is, to kill the germs. We must never forget, however, that the poisonous matter causing indigestion and diarrhea, which germs may have produced in milk before it is swallowed, still remains unaltered by sterilizing. The germs are killed by the process, and the milk grows no worse, but also grows no better. It is therefore of the utmost importance to get clean milk at the outset, just as free from germs as possible. From dairies near some of the large cities of the United States milk can now be obtained which is under medical supervision, and in which the number of germs is so small that no sterilizing of any sort is needed. In other cases cows are owned by the parents of the baby, and the milk can be carefully supervised and special precautions taken against contamination with germs, so that here, too, sterilization of any kind may not be needed. As one cannot, as a rule, get milk of the kinds described, and cannot be certain of the degree of contamination of the milk which one does get, sterilization of some kind is usually required. Indeed, it is better to subject even the best milk to this in the hottest summer weather. There are various means which may be employed for accomplishing this end, all of them depending upon the fact that a temperature equalling that of boiling water, or even less, if applied sufficiently long, will prevent decomposition, and will also kill any germs of such diseases as typhoid fever, diphtheria, and the like which may chance to be present. The milk mixture may be boiled in a vessel immediately before using, or it may be placed in bottles and those surrounded by boiling water, or steamed in a double boiler for three-quarters of an hour. The objec-

tions to actually boiling the milk are that it gives an unpleasant taste, and certainly affects its chemical character in such a way that it becomes less digestible than before. It is also very troublesome, because it must be done at each feeding. The other methods are crude and not very satisfactory. It is far better, therefore, to procure at once a special apparatus for sterilizing, since its initial cost is small and it will save a world of trouble in the end. It should be almost as much of a necessity in the household as are the baby's clothes.

The great principle of all sterilizing is, first, the early killing of germs present in the milk, and, second, the preventing of other germs from entering into or developing in it later. If both these ends are fully met, the milk will keep sweet for months or even years. Such perfect preparation is, however, seldom attained, and is not necessary.

There are two classes of sterilizing apparatus used to accomplish the destruction of the germs: one, known as a "sterilizer," which sterilizes the milk at a boiling temperature (212° F.); the other, called a "pasteurizer," which is really a modified sterilizer, killing the germs at a much lower temperature. Of recent years the latter has become much the more popular. Of the sterilizer, various forms have been devised, but one of the best is that known as Arnold's. This apparatus is provided with eight bottles, each holding a little over seven ounces, and being marked on the glass with a graduated scale of ounces, by means of which the amount of nourishment poured into them can readily be measured (Fig. 52).[1]

The method in detail for preparing the baby's food, including the use of the sterilizer, is as follows: As soon

[1] Made by Wilmot Castle & Co., Rochester, N. Y., and sold for from $3.00 to $4.00, according to size.

as practicable after the milk and cream come in the morning, the mixture for the entire day should be prepared according to the formula prescribed by the baby's

FIG. 52.—Arnold sterilizer.

physician. As large a quantity should be made as the table on page 134 or the experience with the individual child shows will be required for the twenty-four hours.

An eight-ounce or sixteen-ounce glass graduate will be found very useful in measuring the liquids needed. In the absence of this, a graduated nursing-bottle may be employed, but this is much less convenient and accurate. The sugar should be dissolved in the water, and the other ingredients then added. The bottles, previously thoroughly cleaned—by hands which are themselves thoroughly clean—should each be filled with as much of the mixture as is required for each feeding. They must next have their mouths carefully dried and then stopped with plugs of raw (not absorbent) cotton. They are then placed in the rack in the sterilizing chamber and the lid and hood are applied. The pan of the sterilizer is now filled two-thirds full with water, and the whole is placed on the hot stove for an hour. About twenty minutes of this time will be occupied in heating the milk up to the high temperature required, and the remainder in keeping it at that point and thus sterilizing it. Raw cotton is used as a plug because experience shows that the minute germs cannot pass through it. It is best, however, that it shall not come into contact with the milk.

When it is desired to carry the bottles about to any extent after sterilizing, it is better to use a rubber cork instead of the cotton. In this case the bottles, with the corks very loosely in place, are put in the sterilizer for about twenty minutes until the liquid and the air contained is thoroughly heated. The corks are then pushed firmly into place and the sterilizing is continued. The bottles thus corked may lie afterward in any position.

Sterilized milk prepared in this way should keep perfectly sweet for a time without being placed on ice. As an additional safeguard, however, the bottles should be kept in the refrigerator. We should never forget that the cotton plug must not be removed, even for a moment,

from the time it is first put in place until the time for feeding the baby comes.

When milk is to be prepared for use while travelling, a more thorough sterilization is necessary in order to avoid the possibility of any germs being left alive. To accomplish this the bottles of milk should be subjected to sterilization upon one day, again upon the second, and then again upon the third.

The disadvantage of using lime-water in preparing the milk mixture becomes evident in sterilizing. It is largely precipitated by boiling, and is thus destroyed, and the alkalinity of the mixture is reduced. We can, of course, obviate this by adding the lime-water to each bottle just before feeding the baby, but it becomes rather a complicated matter to calculate just what quantity of it is required with the gradually increasing amounts of nourishment which the baby demands. The use of soda-solution instead of lime-water allows us to complete the mixture at the outset, and is to be preferred where sterilizing is ordered. With pasteurizing the difficulty does not exist.

As already stated, it seems certain that the boiling of milk, or even the sterilizing of it in the manner described, lessens its digestibility to a considerable extent. On this account pasteurizing is much to be preferred, and is, indeed, the method now approved by most physicians, the sterilizing at the temperature of boiling water being seldom recommended. The process, as we have seen, is only a modified sterilizing. It was devised by the celebrated French chemist Pasteur, and first employed in the manufacture of wine. As applied to milk it consists in heating the bottles containing the milk mixture to a temperature of 155° or 167° instead of 212° F., as in ordinary sterilizing, and in then removing them to the refrigerator just as soon as they will stand the cold. It

has been found that this process destroys the germs sufficiently for practical purposes, and that it does not alter the digestibility of the milk or affect its taste.

Of the devices for pasteurizing, a very satisfactory and simple one is the Freeman pasteurizer (Fig. 53). This consists of a metal pail into which fits a rack holding the bottles, much as in the sterilizer. The rack has a receptacle for each bottle, holding just enough cold water to surround the bottle and keep it from cracking through a sudden change of temperature. The pail is filled with water up to the circular groove upon it, heated to boiling on the stove, and then removed. The rack with bottles, prepared as for sterilizing, is then placed in it, the lid applied, and the whole allowed to stand on a table for forty-five minutes. The exact quantity of water required has been accurately calculated by the inventor. The scientific principle involved is that while this amount of water cools, the milk in the bottles grows warm, until both soon reach the desired temperature. After the forty-five minutes have elapsed, water from a spigot is turned into the pail in order to cool the bottles rapidly, and these are then kept directly upon ice. The use of the apparatus is very simple, its cost is small, and one should certainly be procured whenever a child has to be fed artificially.[1]

FIG. 53.—Freeman pasteurizer.

It is perfectly possible to pasteurize in other ways, but

[1] The Freeman pasteurizer can be obtained from instrument-makers or druggists, or from the manufacturer, James T. Dougherty, 409 West Fifty-ninth Street, New York, at a cost of $3.50.

the process is troublesome, for to obtain satisfactory results the temperature must be exact. We may, for instance, use the Arnold sterilizer, leaving the hood off and setting the lid ajar, and continuing the heating for forty-five minutes. But to be sure that we are obtaining the correct temperature it is necessary to have a special thermometer in one of the bottles and to watch this constantly. So, too, it has been proposed to place the bottles of milk in a dishpan or large saucepan of water, preferably with an inverted tin pieplate with holes punched in it laid inside as a false bottom, and to heat this until the thermometer in the water reaches 170° F. The pan should then be removed from the stove, covered with an old blanket, and allowed to stand forty-five minutes. But here, too, the troublesome use of a thermometer is required, and after the pan is removed from the stove we do not know at all what temperature the milk actually maintains. The result cannot be accurate.

Indeed, pasteurization, though so simple and secure with a pasteurizer, is not a safe and easy process with any makeshift, and all such should be avoided. Unless the temperature is correct the desired results are not obtained. It has also been found that although the germs are killed by pasteurizing, the spores—*i. e.*, the undeveloped germs—are not. If the milk is not kept constantly cold these spores develop with very great rapidity. It is much better to sterilize outright than to do imperfect pasteurization. But no amount of heat applied will make bad milk good.

A few words must be said about the articles required for feeding the baby with the artificially prepared food, and the method of doing this. It is usually unnecessary to have any special nursing-bottle, for the ordinary narrow, cylindrical bottle with wide mouth, such as is used in the

pasteurizer, answers for nursing as well, and occupies less space in the refrigerator (Fig. 54). When the time for giving nourishment comes this bottle containing the prepared milk should have the cotton plug removed and be fitted with a rubber nipple, and then be set in a vessel of water, which should be heated until the contents of the bottle are at a temperature not exceeding 95° to 100° F. A special thermometer may be put in the bottle during the heating. This ensures accuracy (Fig. 55).

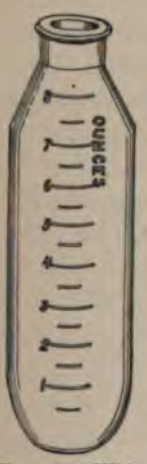

FIG. 54.—Wide-mouthed nursing-bottle.

FIG. 55.—Bottle-thermometer.

FIG. 56.—Bottle-heater.

FIG. 57.—Alcohol stove.

Since the baby is apt to wake hungry and impatient in the night, it is well to be able to heat its milk quickly. A small, narrow, cylindrical tin vessel, tall enough to hold the bottle and to cover it with water to the neck only, about three inches or less in diameter, and with a perforated false bottom, answers the purpose admirably (Fig. 56). Such a vessel, heated on an alcohol pocket stove (Fig. 57), or preferably over a Bunsen burner or other

gas-heating apparatus, will take but a very short time to bring the milk to the proper temperature, whereas a receptacle holding a large quantity of water will take much longer. Any tinsmith can make a vessel of this sort, or one specially made at my suggestion can be purchased.[1] Many mothers endeavor to heat the baby's food by putting the bottle containing it directly into hot water. This is a bad plan, as it is liable to crack the glass. Heating gradually in the way described takes very little longer.

In giving the bottle the child should be laid upon the back, or should be held in the arms much as in the position for nursing from the left breast. The bottle should be held in the hand, and its position be so changed from time to time that its neck is always full of milk. The baby requires ten or more minutes to finish its meal. If the rubber collapses badly, or if the milk does not flow freely, the edge of the nipple should occasionally be lifted from the neck of the bottle for a moment and a little air allowed to enter. It is well in any case to withdraw the nipple from the child's mouth now and then to permit of a moment's rest and to allow air to enter the bottle.

When the child has emptied its bottle it must be deprived of it immediately. If the bottle has not been emptied completely, the remaining contents must be thrown out at once. To let the baby continue to suck after the bottle is empty is a very bad practice. If the baby is allowed to suck at any nipple for the sake of quieting it at other times than when fed, it should be one of the holeless ones, attached to an ivory disk—a "comforter," as it is called; but the advisability of per-

[1] The apparatus complete, with asbestos alcohol stove and thermometer, can be obtained from J. J. Ottinger, 20th and Spruce Sts., Philadelphia, at a cost of $1.75. The vessel alone costs 50 cents; the thermometer, 75 cents; and the alcohol stove, 50 cents.

mitting this is very questionable. It is very liable to be dirty and even infected from frequent falling on the floor, and the constant sucking stimulates the salivary glands too greatly. An ordinary nipple stuffed with cotton certainly ought never to be employed for this purpose.

Bottles employed for feeding should be made very smooth inside, without angles and depressions which col-

FIG. 58.—Bottle brush.

lect milk and render cleaning difficult. Immediately after nursing they should be rinsed well and then submerged in a strong solution of washing-soda and water. They should stand in this until evening, when they may be rinsed thoroughly in pure water, and have the interior scrubbed with a bristle brush (Fig. 58). They should finally be boiled just before filling them.

FIG. 59.—Varieties of rubber nipples.

The rubber nipples, of which there should be several, are preferably of conical or of bulbous shape (Fig. 59). Those of black rubber are the best. Those nipples should be chosen which have the least odor and taste; as babies sometimes object to this. They should not be too long or

they will press upon the infant's palate. The openings in the end should be large enough to allow the milk to pass freely when sucked, but should not permit it to flow too fast. When the bottle is inverted, the milk should drop easily from it, but not run in a stream. If the holes are not of sufficient size, they may be enlarged with a hot needle. As the nipple gets older it collapses too easily and the holes become too large, and a new nipple must be used. There are nipples made with rubber ribs upon the inside, the object being to add to the stiffness and prevent collapsing. Others come without holes, in order that the mother may make them herself of the size she desires. At once after nursing the nipples should be scrubbed thoroughly without, and then, by inverting, within, with a bristle brush, and after this be kept submerged in a solution of boric acid (Appendix, 79). Once a day all the nipples should be sterilized by boiling. Just before using they should be dipped for a moment in hot water. The nipple connected with the bottle by a long rubber tube should not be used under any circumstances. It is utterly impossible to keep such a tube clean, and the device cannot be sufficiently condemned.

When there is unusual trouble experienced with the collapsing of the nipples, some special method of allowing the air ingress to the bottle is necessary. There is a ventilated nipple on the market which answers the purpose very well. In it a very small rubber tube connected with the outside passes from the side of the nipple into the bottle. This nipple is more difficult to keep clean than the ordinary form unless unusual precautions are taken. Different forms of ventilated bottles have been recommended. One, for instance, has a small pinhole-size perforation through the neck. Another has an air-valve in the bottom. As a rule, however, no special method of

allowing air to enter is needed if the instructions already given are followed. In case special nursing-bottles of any kind are desired, there should be at least two of them, in order that one may have ample time to soak. The milk from the pasteurizer bottle can then be poured into one of these just before feeding the infant.

(3) **The Individual Peculiarities of the Child.**—We have to consider finally the third factor in infant feeding —namely, the element of idiosyncrasy, which renders the nourishment of babies not the simple matter it might otherwise be. With all our care the cow's milk preparation cannot be made exactly identical with woman's milk. We may arrange to have, for instance, exactly the same amount of proteids and of fat in each, but these in themselves differ somewhat in chemical character from those of human milk. Consequently, the milk mixture prepared theoretically in the best manner possible may not agree. The physician will then try to discover by careful study of the symptoms what combination suits the baby best. It is here that the individuality of the child comes in, for, of course, what answers for one may not do at all for another. In such cases we may try certain of the patented infant's foods on the market, or we may make special mixtures, increasing or oftener decreasing the quantity of some one or more of the ingredients of the cow's milk mixture; or we may predigest the food or modify it in some other way until we discover something which suits the baby's digestion. I cannot too strongly urge that no mother make these trials on her own responsibility. The problem is too serious for any unskilful experiments, and the solution often exceedingly difficult, even for the most experienced physician.

Regarding the numerous patented foods it need only be said that some of them are harmful and none of them

are necessary or desirable for a child with a healthy digestion. Some are made from cow's milk, just as the mixture recommended is. Although many of them claim to be "a perfect substitute for mother's milk," none of them are this, and many contain starch in considerable quantities. Some are made entirely from starch which has been transformed into dextrin or malt-sugar in the process of manufacture. This procedure certainly presents no advantage over, and is in most respects inferior to, the direct addition of milk-sugar to the milk in the manner recommended. Apart from the fact that the patented foods are very prone to produce rickets or scurvy, the very best of them are only tolerably successful efforts to simulate mother's milk, and this is no more than we can do ourselves by following formulæ given by a physician. A mother who wishes to feel sure that her baby is getting nourishment upon the composition of which she can fairly well depend will prepare her own mixture.

In the rare instances in which some individual peculiarity exists which renders it advisable that an infant be tried with one of the foods upon the market, the physician in charge, and not the mother or the nurse, should have the selection. He will probably choose one which is free from starch. The mother can very readily and simply, in the following way, satisfy a laudable curiosity regarding the presence of starch in any of the foods on the market: Dissolve a portion in hot water, add a few drops of tincture of iodine to a tablespoonful of water, mix a little of this with the dissolved food, and if starch is present a *blue color* will result.

Of one form of the proprietary foods, viz., *condensed milk*, there are very numerous varieties on the market. It is rarely to be recommended. When diluted sufficiently to make the proteids digestible it invariably contains

far too little fat; and in many cases it is diluted so much that the proportion of proteids also is much less than it should be. I have seen so many babies starving on condensed milk that I rarely give it. It is true that some babies grow fat and are seemingly healthy, but the health is often only apparent, and rickets is very liable to result. If food is necessary during the first few days of life, owing to tardy secretion of breast milk, condensed milk could be employed; but even then it offers no special advantage over feeding with a much diluted cow's milk mixture. A time when condensed milk may sometimes be advantageously used is upon railway journeys and the like, but even then it is better to use milk which has been specially sterilized, as recommended on page 151. Condensed milk could, of course, be strengthened by the addition of cream before using, and thus made a serviceable food, but this method presents no advantage over that of preparing the food entirely at home in the manner already described.

In place of the commercial foods there are several home-mixed milk preparations which experience has shown to be of value in some cases of delicate digestion. One of these is the gelatin food which was recommended by Dr. J. F. Meigs (Appendix, 14). The gelatin and the arrowroot in this mixture seem to prevent the formation of so heavy a curd. Another useful preparation in some cases is one into which whey and cream enter in varying proportions (Appendix, 17). Another serviceable formula in cases of delicate digestion is a mixture of whey and egg (Appendix, 15). Still another is a mixture of 1 part of cream and 5 or 6 parts of water or barley-water. These cream mixtures are often of great service where a child cannot take milk at all. There are still other preparations, such as albumen-water (Appendix, 3), veal

tea (Appendix, 19), etc., which contain neither milk nor cream. Their use, however, is limited entirely to children who are actually ill rather than to those with delicate digestion merely or with some idiosyncrasy regarding food.

In some instances peptonizing the food is of great service. The method of doing this will be described later (Appendix, 27–38). We must bear in mind that the administration of a predigested food during a long period takes away, to some extent, the power of the stomach to do its own digestion.

The admixture of thickening substances containing starch for the purpose of "breaking the curd" is not to be recommended as a routine practice. In some instances, however, it is certainly of benefit. (See Oatmeal-water, Arrowroot-water, and Flour-ball; Appendix, 5, 7, 20. See also Second Appendix, p. 425.)

In this connection we may consider more at length the very important subject already referred to—that of the administration of food containing starch. An infant in the first few months of life possesses only slight power of digesting starch. The pancreatic juice and the saliva, the function of which it is to digest starch, are little developed at this period, and even after the age of four months the power increases but slowly. It is a very frequent custom with mothers to give children a crust of bread to bite upon. Indeed, a baby is lucky if it gets off without any further maternal experimentation than this, for it is during the first eighteen months of life that so many innocents are slaughtered by "just a taste" of table food, given on the ground that because they wanted it, it was right for them to have it. It is best not to allow even a crust before the child is nine or ten months old, by which time a thriving baby may take starch in small quantities without disadvantage, although it does not

need it. The better course, however, is to allow no starch, nor, in fact, anything but milk, until the age of one year. In very hot weather no change whatever should be made in the diet, even though the child be more than a year old.

Of course, these remarks apply only to thriving children. It sometimes happens in the last months of the first year, or even earlier, that the diet must be supplemented in various ways, as by certain meat foods, such as beef-juice and various peptonized beef preparations, and sometimes even by starch in considerable quantity; but a healthy baby does not need these things, and certainly an ill baby should not receive them except by medical advice. So, too, it is often necessary during the latter part of the first year, if the baby is not growing at the proper rate, to increase the amount of milk in the mixture to, perhaps, one-quarter, one-half, or even a larger fraction of the total volume; but this should not be done unless it is actually and undoubtedly required (see pp. 136 and 147).

We have so far considered only the manner of feeding a baby before the time of weaning. While it is being weaned its nourishment may be gradually increased in strength. This applies equally well to a bottle-fed baby who has reached the usual age for weaning. By about the age of twelve months a child may be fed upon milk but little diluted, and may begin to take other articles of diet in addition, such as beef-juice and starchy food in moderate quantity. These will be given from a spoon. Somewhere between twelve and eighteen months of age most children should learn to take most of their milk from a cup, the chief disadvantage of the bottle at meal-time being that the milk is taken without pause, and the desire for solid food is liable to be interfered with. Taking milk

from a bottle before they sleep in the morning and at night is, however, a great comfort to the child even after this period.

As a guide for the feeding of a child of from twelve to eighteen months the following diet list may be of service. The numbered menus indicate the choice that the mother may have, alternating them so that the child will not tire of any:

Diet from One Year to Eighteen Months.

Breakfast (6 to 7 A. M.).—(1) A glass of milk with stale bread broken in it. (2) Oatmeal, arrowroot, wheaten grits, hominy grits, etc., or one of the numerous good breakfast-foods on the market, made into a porridge and well cooked, and with the milk mixture in use poured over it. (3) A soft-boiled or poached egg with bread broken in it, and a glass of milk.

Second Meal (10 A. M.).—A glass of milk.

Dinner (1.30 to 2 P. M.)—(1) Bread moistened with dish-gravy (no fat), beef-tea, or beef-juice (Appendix, 24); a glass of milk. (2) Rice or grits moistened in the same way; a glass of milk. (3) A soft-boiled egg and stale bread thinly buttered; a glass of milk.

Sago, tapioca or rice pudding (no raisins), cornstarch or junket in small quantities as dessert with any of these diets.

Fourth Meal (5 to 6 P.M.).—A glass of milk or some bread and milk.

Fifth Meal (9 to 10 P.M.).—A glass of milk.

It is, of course, understood that the baby does not suddenly plunge into any such diet at twelve months, but that the list and the variety are only very gradually increased, and that milk remains the principal article of diet. Not every child, too, can take milk entirely undiluted during the first portion of the second year. Porridge of some sort is the first new article of diet tried, one not of oatmeal being first used, as this is rather more

difficult of digestion than most of the other cereals. Eggs are not given before the age of fifteen months, as they disagree with many children. The bread used is more nutritious if made of whole wheat flour rather than of white flour. Fruit of some sort, such as orange juice, prune juice, and baked apple free from skin may well be given in many cases. The last meal should be offered only if the child wakens. If it rouses some hours before the time for the first morning meal, and remains awake, it may have a cup of milk to stay the stomach until breakfast. Milk which needed pasteurizing during the first year requires it in the second also.

After the age of eighteen months up to that of two years the diet is only very little more extended. The following list will be a guide:

DIET FROM EIGHTEEN MONTHS TO TWO YEARS.

Breakfast (7 A. M.).—(1) A glass of milk with a slice of bread and butter or a soda, Graham, oatmeal, or similar unsweetened biscuit. (2) A soft-boiled egg with bread and butter and a glass of milk. (3) Porridge as described in the previous list.

Second Meal (10 A. M.).—(1) Bread broken in milk. (2) Bread and butter or a soda or other biscuit with a glass of milk.

Dinner (2 P.M.).—(1) Boiled rice or a baked potato mashed and moistened with dish-gravy or beef-juice; a glass of milk. (2) Mutton or chicken broth with barley or rice in it; some bread and butter, and some sago or rice pudding made with milk, cornstarch or custard. (3) A small portion of minced white meat of chicken or turkey, or minced rare roast-beef, beefsteak, lamb, mutton, or fish; bread and butter; a glass of milk.

Fourth Meal (5 to 6 P.M.).—(1) Bread and milk. (2) Bread and butter and a glass of milk.

It is probable that no fifth meal will be needed, but if it is, it should consist only of milk. It is important to know that not every child can digest potato easily, and

that this variety of starchy food must be tried with caution. Further, that many children have great difficulty in digesting any form of starch. In such cases the diet should be chiefly of animal food during the first two years of life. It is also true, however, that some children cannot take meat daily without evidences of its affecting the health unfavorably in some way, and that the eating of eggs daily is not always well borne. In my experience the diet list given suits the average healthy child, and when exceptions to this are found, medical advice should be obtained.

At the age of two years we may do away with the mincing, and for dinner give the child tender chicken, fish, mutton, or beef simply cut small. Fresh or stewed fruits in small quantity are also good, among these being included raspberries, strawberries, grapes freed from the seeds, peaches, juice of oranges, and stewed apples. Bananas should not be used.

The diet from two to three years may be as follows:

Diet from Two to Three Years.

Breakfast (7 to 8 A. M.).—(1) A small portion of beef-steak, with oatmeal, hominy grits, wheaten grits, corn meal, or other cereal porridge with plenty of milk. (2) A soft-boiled egg, bread and butter, and a glass of milk.

Second Meal (11 A. M.).—(1) A glass of milk with bread and butter or with a soda or other biscuit. (2) Bread and milk. (3) Chicken or mutton broth.

Dinner (2 P. M.).—Roasted fowl, mutton, or beef cut fine; mashed baked potato with butter or dish-gravy on it; bread and butter; rice; macaroni. As dessert, tapioca, sago, or rice pudding, junket, or some of the fruits mentioned.

Supper (6 P. M.).—(1) Bread and butter. (2) Milk with soda or similar biscuit or with bread and butter.

It is very necessary to bear in mind two facts regarding these tables: first, that they are only a guide, not an absolute rule, both as to the time of meals and as to the nature of the food; and, second, that they rather represent the extreme of what a child can take than indicate what every child ought to have. Although mothers are very prone to worry because their children are not getting "strong enough food," there is less danger of this happening than of the food being too strong. Many a baby does wonderfully well almost with milk alone long after others are taking a diet somewhat like the list given for the age of eighteen months to two years. In such a case it is folly to alter the diet hastily. In other cases just the opposite is true, and a stronger diet is needed earlier than the average age for it. The weight and the general condition and needs of the baby are far better guides than the number of months old which it happens to be or the number of teeth cut. In fact, no infants under two years masticate well, no matter how many teeth they have. It is always very important, as previously pointed out, to make no changes during the hot weather when it is possible to avoid doing so. On the least disturbance of the digestion, too, the diet should be cut down greatly for a day or two.

In some cases a few of the green vegetables may be tried at this period, but with caution. Among the best of these are peas, string beans, asparagus tips, spinach, and stewed celery. It is better, after thorough cooking, to press them through a colander.

From the age of about two and a half years onward the child may sit at the table in its high chair with the family or at a small table close to the mother, if this is found desirable. If it never receives articles of diet not suited

to it, it will soon learn not to ask for them. A little table-tray will protect the tablecloth from accidents.

At the age of three years the child may have its diet considerably increased in variety, since it has now acquired powers of digestion much more like those of the adult. It is very important at this age to prevent a child from helping itself to all sorts of edible articles both at the table and, especially, between meals. If it is really hungry, there is no objection to its having some simple thing between meals, not sufficient in amount to lessen the appetite at the regular meal-time. It is impossible to give any series of distinct diet lists for the age of three years and onward, inasmuch as the child now eats selections from the food provided for the family in general. Care must be taken that it receives no indigestible, highly seasoned, or made-over dishes, and that it masticates slowly and thoroughly. The chief meal (dinner) ought always to be in the middle of the day, and the supper always light, as of bread and milk or cereals and milk, in order that sleep may be sound. Milk should still constitute a very large part of the diet, and meat more than once a day is sometimes a disadvantage, although I have oftener seen disturbance of health come from an excess of starchy food than from meat. Cocoa is serviceable in some cases. Cream may be poured in small amounts over the porridge given. The following lists may serve as a guide to the kinds of food suitable to a child of three years and later, and to those which must be used with care or be avoided. Of course, as the child passes this age the list of permissible articles gradually increases until, by the time of puberty or earlier, the diet is practically that of adults.

Foods Permitted.

Meats.—Broiled beef-steak, lamb chops, and chicken; broiled liver; roasted or boiled beef, mutton, lamb, chicken, and turkey; broiled or boiled fish; raw or stewed oysters.

Eggs.—Soft-boiled, poached, scrambled, omelette.

Cereals.—Light and not too fresh wheaten and Graham bread, toast, zwieback; plain unsweetened biscuit, as oatmeal, Graham, soda, water, etc.; hominy grits, wheaten grits, corn meal, barley, rice, oatmeal, maccaroni, etc.

Soups.—Plain soup and broth of nearly any kind.

Vegetables.—White potatoes, boiled onions, spinach, peas, asparagus, except the hard parts, string and other beans, salsify, lettuce, stewed celery, young beets, arrowroot, tapioca, sago, etc.

Fruits.—Nearly all if stewed and sweetened; of raw fruits, peaches are one of the best; pears; well-ripened and fresh raspberries, strawberries, blackberries; grapes without the skin and seeds; oranges.

Desserts.—Light puddings, as rice pudding without raisins, bread pudding, etc., plain custards, wine jelly, ice-cream, junket.

Food to be Taken with Considerable Caution.

Kidney, muffins, hot rolls, sweet potatoes, baked beans, squash, turnips, parsnips, carrots, egg-plant, stewed tomatoes, green corn, cherries, plums, apples, huckleberries, gooseberries, currants.

Foods to be Avoided.

Fried food of any kind; griddle-cakes; pork; sausage; highly seasoned food; pastry; all heavy, doughy, or very sweet puddings, unripe, sour, or wilted fruit; bananas, pineapples, cucumbers, raw celery, raw tomatoes, cabbage, cauliflower, nuts, candies, preserved fruits, jams, tea, coffee, alcoholic beverages.

The feeding of a child when sick is such an important matter, and one so very difficult, that it must be left nearly entirely to the judgment of the physician. The remarks already made upon the feeding of children with delicate

stomachs or with idiosyncrasies regarding food apply in this connection also. The further brief consideration which we can give to the general principles underlying the subject will be found in Chapter XI., in the section upon the Management of Sick Children.

In the Appendix will be found some recipes for various forms of food useful in sickness and health, including food-preparations for use in the bottle.

CHAPTER VII

SLEEP.

A VERY young baby is asleep nearly all the time except when nursing or having its toilet made. Its total amount of sleep should be about eighteen to twenty hours every day. As it grows older it sleeps less and less, and at the age of two months it will often lie awake quietly for an hour or so at a time. By the time it is a year old it requires fifteen or sixteen hours of sleep every day; at two to three years, twelve or thirteen hours; at four to five years, ten or eleven hours; and at twelve to thirteen years, nine or ten hours. A baby who is sleepless and fretful at night generally has something the matter with it or else has been badly trained. It is important from the very first to accustom a child to sleep at definite hours, else the parents' lives are in danger of becoming a burden to them. To walk the floor night after night or to be obliged to sit up with a healthy child and sing it to sleep is a form of martyrdom which is entirely uncalled for. Provided one is sure that the baby is not sick, it should be put to bed and not be taken up again to induce it to sleep, and the mother should avoid sitting in the room unless she wishes to be obliged to sit there every

evening. If the little one never knows any other way than this of being put to sleep, there will usually be no difficulty in the matter after it has once learned its lesson; but to begin the training and not persistently to continue it is a fatal yielding of which the child will be sure to take advantage when a second battle begins. The training cannot be begun too soon. It is astonishing at how early an age a baby learns that it has only to cry to get what it wants.

Except for the first few days of life, during which, as is generally thought best, it should lie on its right side as much as possible, the position which a healthy child assumes while sleeping is a matter of not the slightest consequence. If it wants to lie on its stomach, there is no possible good objection to be raised against it. There is sometimes a great deal of needless anxiety among mothers with regard to this matter. It is only in a rickety child that a deformity would be liable to occur from the habit—as would equally well result from the constant assumption of any other position. We must remember the necessity of varying and changing the position now and then of every child too young or too feeble to turn itself easily and often.

Before the age of four or five months the baby is put to bed at 5.30 or 6 P. M., and should rouse but once or twice during the night. After this age it should go to bed at 6 or 7 in the evening after nursing, be awakened and fed at 9 or 10 P. M., but be trained to sleep without further nursing until 6 or 7 in the morning. It will then need feeding again, after which it may again sleep if it desires. Through the day it may at first sleep as much as it feels inclined, but it is sometimes a good plan, by the time it is a month old, to encourage its keeping awake for about an hour before its bed-time, in order that it may have a better night's rest.

By the time the baby is six months old it may perhaps begin to limit its sleep by day to a nap in the morning of from one and a half to two hours. As a rule the baby should not be allowed to lengthen its morning nap too greatly, or the hours for feeding will be badly interfered with. If it is taken up regularly at a certain time, it will soon learn to rouse then of its own accord. The time for the morning nap will depend largely upon the hours of nursing, and to some extent also upon the duties of the mother if she has the sole care of the baby. The child should be undressed for it and be regularly put to bed. Often at this age a short afternoon nap is needed, but this should not last longer than until 4 P. M., lest the night's rest be interfered with, and it should not be allowed unless the child does not do well without it. At one year of age and on to the age of two years the same arrangement of the sleeping hours, including the hour for going to bed, holds good, except that an afternoon nap is not desirable. The morning sleep will then be of one and a half to two hours' duration, beginning at 11 or 12. If the fifth meal at 10 P. M. is not required, the child can sleep uninterruptedly throughout the whole night. At two years of age the morning sleep is shortened to one-half or one hour. From this time up to the age of four or five the morning nap is advisable if the child will take it, but is not to be insisted upon. Children of four years or older should continue to go to bed at 8 o'clock or earlier, and the hour should gradually be changed to 9 o'clock by the age of ten or twelve years.

A certain degree of latitude is to be allowed to all that has been said. For instance, if a child persistently wakens very early in the morning and does not go to sleep again, it may be better to make the bedtime somewhat later. So, too, a child should generally be allowed

to wake of its own accord in the morning, even though the regular hour be passed. This is certainly true up to the age of four or five years, and even after this it must be remembered that children need a great deal of sleep. If rising at a certain hour in the morning is necessary, and the child seems tired, the hour for retiring must be made a little earlier. In no case must the total amount of sleep desired be curtailed. A child of any age should not be allowed to lie in bed after thoroughly awake.

It is important to preserve great regularity in the hours of sleeping. Few things upset a child more than a failure to do this. There should be no romping games or excitement of any nature for at least an hour before going to bed at night, or the child will be liable to sleep badly.

We must next determine what is best for the baby to sleep in. It should never sleep in the bed with its mother. Not only is there a possible danger of her overlying it—a danger which is real and not imaginary, since statistics show that it occurs very frequently, and history records it even as long ago as the time of King Solomon—but there is a constant temptation to nurse it too often. The baby, on its part, acquires the bad habit of nursing only partially, sleeping a short time, rousing, and nursing again. Moreover, it is very liable to get the covers over its head and to obtain much less fresh air than it should.

The first bed generally used for the baby is the bassinet, and sleep should begin in this from the first day of life. The bassinet consists of a wicker basket with high sides and with or without a hood over one end. It should stand high, so as to avoid draughts on the floor. It should not be too large to be easily portable, in order that it may be readily moved from one room to another

if desired. It may conveniently be lined with some colored or white material and covered outside with Swiss muslin; but these and any further decorations may be as varied and as elaborate as the mother pleases. It is, however, better to have them simple and inexpensive, to permit of changing them when dusty or soiled.

FIG. 60.—Bassinet.

The illustration shows one of the ordinary forms of bassinet furnished in the shops (Fig. 60). A large oval clothes-basket would answer as a substitute.

The bassinet is superior to the crib for the early months of life, because it gives the child more support at the sides and keeps it warmer if well tucked in. Cur-

tains may be fitted to it, and are of service if there is any danger of draughts, but as they cut off the fresh air and catch the dust it is better to do without them; place the bassinet in a sheltered situation, and protect it, if necessary, from draughts and light by a portable screen.

A cradle may be used instead of the bassinet. The form with projecting rockers is a constant invitation to everybody to trip over them, and the swinging form is also not to be recommended unless it is never swung. Although the rocking probably does no harm, it is against all the principles of training which we have been considering to make it a necessity in putting the child to sleep. If the child has never been rocked, it can never miss it.

When economy is an object the bassinet could be dispensed with and a crib used from birth, if the sides are lined to cut off draughts and the child is properly supported with pillows beside it. In any case, when the baby is eight or nine months old it should be transferred to a crib (Fig. 61), in which it should sleep until five years of age. The crib is best made of white enamelled iron, and should have sides which let down on hinges or on slides, and which are high enough to prevent falling out, for it is astonishing over what high sides a small child can climb. The hinged side takes up much more room in opening, and the sliding variety is consequently more convenient if it is so made that the child cannot by any means let it down upon its arms or legs. The old-fashioned trundle-bed is faulty, as it brings the child too near the draughts on the floor. The crib is, as a rule, better without curtains. It should be provided with a woven-wire mattress, and this should be as high from the floor as in an ordinary bed.

The remaining contents and the manner of making up the bed are the same as for the bassinet, and the one description answers for both. There should be, namely, a soft, thin hair mattress, which is decidedly better for strong children than one of feathers, as the latter is much too warm. Over this is laid a rubber cloth, and the whole

FIG. 61.—Iron crib with drop sides.

is covered by a doubled sheet. Sometimes a quilted bed-cover may be put over the rubber, to increase the softness and warmth. This is a very good plan in winter. It is also sometimes well to place a small pad, like the lap-protector previously described (page 101), directly under the baby, over the sheet. There should be a small, soft, thin feather pillow covered with a fine linen pillow-slip. In summer a pillow of curled hair is cooler. The coverings of the baby in bed consist of a sheet, as many soft blankets as the season requires, and a light spread. In

cold weather an eiderdown quilt is very useful. All the coverings should be light in weight, yet warm. The sheet should be of muslin rather than of linen, as there is a coldness about the latter which it is very difficult to overcome. The pillow-cases, however, are better made of linen.

We must constantly bear in mind the very great importance of properly airing the bed after it has been slept in, and of warming it before it is used again. Every morning the windows of the room should be opened and the bed-covers be stripped off, and, with the mattress, exposed to the air and sun for at least two hours. Before the child is put to bed in the evening the covers should be well pulled down and allowed to stay so for half an hour or more. In cold weather the sheets should be taken off and warmed. Indeed, it is a good plan to warm them at all seasons except in the height of summer. If this is done, there is no necessity for a child to sleep between blankets, unless, possibly, in earliest infancy. It is difficult to keep blankets fresh and sweet if used in this way. If the sheets become soiled, they must be changed at once, no matter how often the soiling occurs. It is important to keep the rubber cloth well cleaned and aired.

The great disposition evinced by most children to wriggle themselves outside of the bed-clothes renders something to prevent this desirable. There are many bed-clothes fasteners described, but as simple a form as any consists of two short pieces of elastic, which are attached to the covers by clamps or safety-pins, one on each side, and to the bedstead or crib by pieces of ribbon or cord (Fig. 62). This plan is rather better than that of pinning the covers to the pillows with large safety-

pins, since the elastic allows of a certain degree of turning and moving about. Even in the earlier days of life care must be taken that the head is not covered by the bed-clothing, as otherwise sufficient fresh air is not obtained. While keeping the child warmly enough covered it is equally important not to make it too warm. This is a fault many mothers have. The cooling of the hands and feet may warn us against too little covering, and free perspiration sometimes against the reverse.

FIG. 62.—Bed-clothes fasteners.

Where the child shall sleep at night is a matter depending largely upon circumstances. The best plan, theoretically, is that which places the baby, after the first few weeks, with its nurse in the night nursery. If the child is nourished at the breast, it can be brought to the mother's room at the proper hours and then be taken back. This relieves the mother of care during the night. If it is bottle-fed, the nurse gives it its nourishment. Many a mother, however, is naturally, and with good reason, unwilling to entrust so much responsibility to any employed person, while in other cases the means of the parents or the rooms of the house do not permit of such an arrangement, and the baby has to sleep in the mother's room. After the age of a year, however, it should certainly have a separate room at night if possible. The morning and afternoon naps are to be taken

in the room used for sleeping in at night. The temperature and the furniture of the sleeping-room are considered under the head of the Night Nursery.

CHAPTER VIII.

EXERCISE AND TRAINING; PHYSICAL, MENTAL, AND MORAL.

THE training of the baby, physically, mentally, and morally, is so large a subject that we can consider only its most salient points.

For the first two weeks of life the baby takes very little physical exercise, but after this it begins to kick and to move its arms about in a way which ensures plenty of it, if only its clothes are of such a nature that the movements are not impeded. At the age of two weeks the child may be systematically carried about in the arms two or three times a day, as a means of furnishing additional change of position. We must bear in mind that its spine is still very weak, and that it must be supported in a proper manner. In lifting the baby the clothing, with the lower portion of the body, is raised well with one hand, the other then slid under the back and head, and the child raised on the outspread palms. The young infant should not be grasped around the chest. It should at first be carried on its back upon a pillow on the nurse's arm, although after it is a month old the pillow may be dispensed with. When three or four months old, and up to the age of six or eight months, it may be seated upright upon the arm, with the hand of the other side supporting its head and back carefully, although as the age advances this support is not always necessary. As the

back bends very easily in any direction in infancy, we must guard against any permanent curvature developing by seeing that the child is carried sometimes on one arm and sometimes on the other.

Closely connected with the exercising of the baby is its exposure to the outdoor air. Although this is often of much benefit, it is a mistake to be in too great a hurry with the process of "hardening," so called, since this frequently only succeeds in making the child ill, just as pampering makes it delicate. No absolute rule can be given for the date at which the baby shall be taken out for the first time. If at the age of two weeks it is well and is properly protected, the nurse when walking with it may carry it into another room of a somewhat cooler temperature. This will give quite sufficient change of air. By the time it is a month old, or even before this, it may be taken into the open air in summer-time, and kept there for ten or twenty minutes on the first visit, and longer on subsequent ones. In midwinter it is better to delay longer, and not to make the first excursion out of doors until the age of two or possibly three months. There is no doubt that it is sometimes still wiser to wait until spring if the baby has been born in the winter season, but this must be determined largely by circumstances and for each individual case. An autumn baby ought, if possible, to go out before winter sets in, and then to continue to do this on all good days. It is important to choose carefully the hours best suited for the daily outing. In summer, almost any hour will answer between seven or eight in the morning and sunset. In winter, on the other hand, hours from ten to three are the best. The morning hours especially are to be preferred, as a rule, because so many days which open propitiously become cloudy by early afternoon, and the baby may miss its outing altogether if the morning is not taken

advantage of. An exception to the hours recommended occurs on extremely warm days in summer. The middle of the day is then far too hot, and the early morning and late afternoon, or even the evening, are to be given the preference.

Damp, windy, or very cold days are always to be avoided during the early months of life, and even after this period exposure to them is of questionable advantage, for we have always to balance the good that may come from the outing against the harm that may result from the unfavorable weather. It is a mistaken idea that every child must be in the open air every day, no matter what the nature of the weather may be. Even on the best days it is important to avoid chilling and to keep a close watch over the condition of the hands and feet. The least chilliness of these is a warning to go in.

One plan which can be safely adopted with autumn or winter babies is that of opening the windows in one of the rooms of the house, wrapping the baby thoroughly, and walking with it in this room for half an hour or so, just as though it were out of doors. This may be begun when it is about a month old. The windows should at first be shut down before the baby is taken into the room, but later they may be left open if the weather is not too cold. Of course, draughts must be avoided.

The first going out should be in the nurse's arms, since the heat of her body keeps the child warm, and the support of her arm and hand renders it much more comfortable. After the age of three or four months, depending on the season, it may be taken out in a perambulator, and remain out much of the day if the temperature is warm.

The choice of the perambulator and the manner in which it shall be used are matters of much importance. The perambulator should be well balanced, so that there is no danger of it tipping over backward, and should espe-

cially have easy springs, in order to save the baby as far as possible from the results of careless wheeling. It should have a mattress for use while the child is still young. This may well be divided into two halves, in order that the lower may be removed when the infant reaches an age at which it wishes to be only partially reclining. It should also be provided with an adjustable seat for use when the child is actually sitting up. It should also have a detachable overhanging sun-shade or adjustable hood for use in the sun. It is necessary, too, to see that this is always taken with the carriage and is always used when needed, as nothing is more common than to find a careless nurse wheeling a baby with the sun full in its face. The color of the shade, or rather of its lining, is a very important matter too often overlooked. One which is white or of some bright color, such as red or yellow, may seriously injure the eyes, for it reflects into them the glare from the ground. The lining, at least, ought to be of some dark color, such as green or brown. The carriage should be provided with a soft warm bed and with warm covers and a pillow. A knitted or crocheted afghan is a serviceable article. For use in summer, mattresses and pillows of hair are much cooler than those of feathers. The question often arises whether it is harmful to allow an infant to sleep out of doors. There is nothing to be feared from it, and no infant should be brought in merely because it drops asleep in its coach. In some cases it may even be well to allow the regular daily naps to be taken out of doors.

As the baby grows more active there is very great danger of its falling out of its carriage. To prevent this accident most perambulators are provided with a straight strap in front of the child. This is often very unsatisfactory, since it does not keep the child either from climbing over, if active, or from being thrown out in case of acci-

dent. Some really serviceable preventive of this very real danger of falling is required, and a very good form is that shown in the illustration. This consists of a strap which goes entirely around the waist, and is attached by smaller straps to the sides of the carriage (Fig. 63).

A child that has reached the age of six months will no longer be content to lie flat in its carriage. It is then necessary to see that it is well supported with extra pillows at the back and sides. For children of this age, or for older ones who can sit easily without support, the adjustable seat should be placed in the coach.

FIG. 63.—Strap for coach.

From the age of three months onward it is an excellent plan to place the baby at times upon a blanket or mattress in some place in the room which is free from draughts, and so to arrange its clothing that it is allowed to make freely all the motions of which it is capable. This gives it a good chance to learn to stand or to creep as soon as it reaches the age for it. A clothes-basket or large box padded with soft material makes a good place for this early exercise. Sitting up for too long a time must be guarded against throughout the first year, and even after this lying down a good part of the time should be encouraged. Whether or not the child shall creep upon the floor depends on circumstances. In winter the lowest layer of air is very liable to be cool, and in severe weather the use of the floor is almost out of the question, even though the nursery has comparatively few draughts. So, too, if a child has a cold, it had better be kept off the floor until well again. The creeping apron

described elsewhere is very serviceable for keeping the air from the child. To prevent a creeping child from reaching unsuitable parts of the room it is a good plan to place it within a small portable pen. The portions of the fence are separable, so that the whole can be put away in small compass when not in use. Pens of this kind can be bought or can easily be made (Fig. 64).

Efforts at walking give the baby abundance of a new kind of exercise, and we must take particular heed that it is not overdone. Too much cannot be said in favor of

FIG. 64.—Creeping pen.

letting the baby take its own time in making the new acquisition. No appliances to aid walking should be used, and the child should not be urged at all. The advisability of using "baby tenders" is very questionable. They may perhaps be of service for a heavy infant who insists on learning to be on his legs, yet who is in danger of growing bow-legged in consequence. Yet it is better, if there seems to be a tendency for the legs or ankles to bend, to discourage walking entirely, as it is much easier to prevent the deformity than to correct it. At this period of life the child should still be kept in the perambulator during the daily airing, but later, when it has learned to

walk pretty well, it may have ten or fifteen minutes' additional outdoor exercise on its feet. Gradually the duration of the outdoor walk may be increased, but the perambulator must still be used for most of the time until the child is two and a half or three years old. A half mile at the most is quite sufficient, and often more than enough, for a walk at this age.

Sometimes children who have outgrown the perambulator will ride with pleasure in a "play" express-wagon or, in winter, on a sled. The little go-carts for children, made in various designs, and known by various names, such as "jaunting car," "mail cart,"

FIG. 65.—Go-cart.

"chair car," and the like (Fig. 65), are serviceable for children over a year of age. They are made of board or of rattan. Certainly some vehicle ought to be ready at hand at this period of life. We are too prone to forget how short the legs of little children are, and how easily their strength is exhausted.

There is one form of compulsory exercise which should be carefully avoided. I refer to the trotting on the knee which is so common with many nurses. When one compares the diminutive size of the baby, lying on its back or stomach in the nurse's lap, with the vigor of the trotting to which it is subjected, there can be no surprise awakened if vomiting and other disturbances of digestion are produced. Even should these not occur, the habit is a bad one, since the baby may gradually become accustomed even to this hard usage, and learn to depend on it for being put to sleep, just as it will depend on singing or rocking when used for this purpose.

In this connection we may leave for a moment the exercise of the body-muscles in general to consider the training of certain others—namely, those which control the emptying of the bladder and the bowels. By the time it is three months old the baby becomes conscious of these acts, and even before this early age its education may be begun. It is most liable to empty its bladder soon after a meal, and to open its bowels with some regularity as to time. If the mother will hold it over a receptacle on her lap a little while before either evacuation is expected, the child will very gradually learn to recognize the purpose of the procedure and will act accordingly. As the baby grows old enough to sit up, even though partially supported, it may be placed in the nursery chair (p. 222) at the proper time, and always with the greatest regularity as to the hour. Patience and perseverance will accomplish the desired teaching at last. It need scarcely be remarked that punishment for delinquencies in this line is totally out of the question at any age. Of course, children differ in the rapidity with which they learn this control. Many have accomplished it by the age of a year; most should have done so by eighteen months

of age; all ought to have learned it by the end of the second year at latest, and some may be trusted during the day when six months old, or even considerably less than this. The control is always decidedly less during the night.

With increasing age children become able to take without fatigue an amount of exercise which is really astonishing. Still, there is the necessity of guarding constantly against an excess of it in the excitement of play, as well as of seeing that every portion of the body shares in it. Rolling hoop can be begun by quite young children, and the use of a rocking-horse is valuable for exercise in the nursery. A tricycle which cannot readily be upset will be of service as soon as a child is old enough to use it. For older children dancing is a useful indoor exercise if done in moderation and with proper precautions against late hours and taking cold. The objections so often urged against skipping rope are in no way valid unless the exercise is indulged in to great excess. After the age of puberty, however, it may be harmful to delicate girls. Skating, especially on ice, is excellent, under proper precautions, for both boys and girls. There is, of course, the risk of falls, but no active sports are unattended by some element of danger. The art of swimming should be acquired by every child, not only for the exercise which it gives, but also for the safety which it may some time ensure. The use of the bicycle is to be commended, provided the guiding apparatus be of such a height and so placed that the child cannot stoop over in the position so generally assumed by bicyclists, and provided that this form of exercise be not employed too exclusively; for although the lower extremities are well used, the upper ones are not sufficiently so, and the position of the arms tends to contract the chest. Tennis and other outdoor games may be indulged in freely. Nothing can be better for chil-

dren than riding, first on a donkey or pony, and later on a horse—the girls, of course, riding astride, just as the boys do. Indeed, none of these outdoor sports are intended for boys alone, and girls should be encouraged to take part in all of them. Many a woman has to thank her romping, outdoor girl-life for the robust health which she afterwards enjoys. Let the girl be a hoyden just as long as she pleases—the longer the better. Sedentary indoor amusements should, in fact, be discouraged. It is much easier to tone her down and "make a lady" of her after a while than it is to tone her up if she has no good constitution on which to build. A girl grows into a "thing of beauty" only if of sound health.

A city-bred child, however, has little opportunity of taking the necessary amount of exercise of any kind, unless a park or an open square be somewhere in the vicinity. It is consequently of the greatest benefit to take growing children to the country, mountains, or sea-side for as much as possible of the warmer season of the year. Places which are merely fashionable resorts are not suitable unless the children are in no way trammelled by the restrictions from which their elders suffer.

We must never forget that many children are disposed to exercise far beyond their strength, especially under the excitement of play with a number of companions. They show no judgment in the matter, and do not realize they are tired until worn out. Over such children a careful supervision must be kept, and an enforced hour of resting, if possible lying down, must be insisted on some time during every day.

Even though plenty of exercise can be had in summer, the inclemency of the weather in winter often presents a great obstacle to obtaining it at that season. Besides this, the confinement of school-life in winter often tells

upon the health of the child. It is now that the well-regulated gymnasium fills a place taken by nothing else. It would be a wonderful aid to the formation of sound health did every child attend one systematically. It is much better to spend a half hour or fifteen minutes there every day than it is to exercise for a longer period only two or three times a week. Where no gymnasium is available much can be done at home. One of the best methods for delevoping the arms and chest consists in swinging on a low swing or hanging for a few moments by the arms from a horizontal bar, repeating this frequently during the day. Swedish movements are of great value, and massage is also of service, although less efficient. The calisthenic exercises now used at many schools are to be recommended highly. It is especially useful in the case of young children to have such exercise accompanied by music, as it makes it of greater interest.

The various sports which have been referred to of course come under the head of *Amusements* also, and exercise the mind as well as the body. Childhood is often called "the play-time of life." The chief occupation of the child is to play, and everything else must be made subservient to this. The training of the mind can be combined with it, but should always hold a secondary place, for there is little use of a sound mind, and little chance of getting it, unless the body, too, be sound. Still, while the child is playing it is learning, and the acquiring of knowledge commences often before we have any idea of it. As we cannot hinder the learning, we must early begin to superintend it, and to guide the baby in its amusements, as well as in other things, in a line which will instruct both its mind and its moral sense.

We can in the limits of this chapter merely touch on

some of the matters connected with the *mental* and *moral training*. This cannot be commenced too early. Even by the age of three months the infant shows evidence of developing a will of its own, which will soon dominate the parents unless kept in check. Early in life the baby needs very little diversion. Indeed, up to the age of five or six months, the child should not be played with at all, and even later all playing before the hour for sleep must be avoided. Before this age it does not require playthings, but now it may be amused by a rubber rattle, or other toys which make a noise, a rubber doll, or a bright-colored worsted ball. We must bear in mind the necessity of cleansing thoroughly and frequently the rubber toys which an infant is constantly putting into its mouth. No toy should be given which can frighten by sudden movements or startle by noises. Later the child needs more toys to be used in the house on rainy days, and others which it can play with out of doors. A heap of clean sea-sand will furnish a child of two or three years an unending source of amusement.

It should not be forgotten that it is not only a foolish extravagance to load a child of any age with expensive and fragile toys, but that it is distinctly prejudicial also. Always looking for something new, the child soon becomes discontented with the things it has, no matter how fresh and good they may be. Lack of valuation, too, breeds lack of care of the playthings. Simplicity in desires will better be attained by having only a few simple toys, although certain others may be kept in reserve and be given only on special occasions or as a special favor or reward which has been well earned. Habits of neatness can be taught in the use of playthings, and even when small a child can learn the lesson of "a place for everything." Toys may be chosen which instruct.

Picture-books, Noah's arks and animals, the kindergarten toys, and, a little later, lettered blocks, are of this class. With the latter many a child has learned its letters almost without effort or special instruction.

There is really no hurry about teaching a child to talk. Of course, the more attention there is given to the matter, the sooner will most babies learn. The only thing which should be carefully borne in mind is the great folly of ever using "baby-talk." It is no more comprehensible to the child and no easier for the mother. Gibberish talked to the baby means that it will learn only gibberish. Then at an age when it becomes a mortification to the parents the child of three or four years may still be talking a nearly unintelligible jargon.

The constant questioning on the part of children is often very trying, but should never be rudely repressed. Bear with it patiently, even encourage it; answer truthfully all you can, and remember how very much there is which the child is so anxious to learn all about. Of course there are times when the questions are out of place and must be gently checked. So, too, with the noise of children: although it is often disagreeable and needs to be stopped, we must never forget that to make a noise is natural, and not to make it is a thing which has to be learned.

It is important to remember that in the instruction of children example is far more valuable than precept. Children are wonderful imitators, and their words and actions will be copied largely from those with whom they are most intimately thrown. If a child is never told a falsehood by its parents or its nurse, and is taught to look upon it with horror, there will be little danger of its becoming untruthful. The punishing of a child for a fault after it has told the truth about it is simply encouraging it to lie on the next occasion. We must not, in this

connection, overlook the fact that the excessively vivid imagination of a child sometimes leads it to view its fancies as realities. Thus it will tell all manner of false stories of what it or others have done or said, and will often actually believe it all. This is only a sort of romancing, and must be sharply distinguished from deliberate lying, with which it has not the slightest connection.

The habit of implicit, unquestioning obedience cannot be taught too early. It is of far too frequent occurrence for a mother to tell her child that if it will obey some command she will buy it a toy or reward it in some other way. There can be no greater folly than this, for the little one needs no great power of reasoning to understand that the act of obedience is thus made a favor done by it to its parent. To obey because the command is given and because the child loves its parents should be the only reason. This does not mean that a parent may be tyrannical, exacting, or unreasonable. Remember that the child may be right and you wrong.

One should never use threats or employ punishments unless they are really necessary. Punishment should be carefully selected, never given in anger, but in sorrow, and never of a nature that may frighten the child or injure its health in any way. The boxing of the ears may do serious harm, and imprisonment in dark closets and similar punishments are equally dangerous. When a child has been threatened with a punishment, and has, in spite of this, committed the forbidden act, it should not fail to pay the penalty, else it will soon learn to despise its parents' commands. Of course, exceptions arise where justice must be tempered with mercy, but these are to be exceptions only. If parents would less frequently threaten with punishment and less often tell their children "*don't*," but give them something to *do*, there would be fewer

lapses from obedience. Indeed, the whole question of punishment, of the "breaking the will" of a child, and so on, is a perplexing one, and far too great to be considered here.

I have said so much in this connection about the importance of obedience because its value is especially great in sickness. Many a time a physician is rendered helpless to a great extent because a poorly-trained child refuses to take medicine prescribed for it, except after losing a pitched battle over it and doing its nervous system injury by the struggle.

A freedom from selfishness is a quality which cannot be taught too early. A child should learn to think and to do for others, and not for itself. This is a difficult lesson to learn, for we are all selfish by nature. It should also learn to have a fitting respect for and to act with gentleness and kindness to all created things, whether animate or inanimate. A child should never be told to "hit the bad floor" against which it has struck its head. This is nothing else than teaching revenge, to say nothing of the foolishness of it.

As the child grows older one of the best means of inculcating a love for and a sympathy with objects in nature is to allow it to have a growing plant or a pet of some kind of which it shall have the care. This teaches thoughtfulness as well as serves as an amusement. Of course, we cannot expect the child to have the whole responsibility of the care of the pet, for this is asking too much of its perseverance and enthusiasm. The parents should assist, but must not take the whole care upon them. In this way the pet does not become a burden or a source of ill-advised reproaches.

I must strongly advise against the common habit of making the baby the centre of an admiring circle of vis-

itors. The baby should see just enough of company to teach it to be free from a dread of strangers. As a rule, however, it should not be brought into the parlor. The custom not only bores the visitors, too polite to say so, but it excites the baby far too much. A little later this course results in the development of a forward child who is always "showing off" or interrupting the conversation of its elders. Children's parties, too, are far too exciting for babies, and even in early and later childhood they should be of rare occurrence and simple in their arrangements, and be held in the very early evening or late afternoon.

Much harm, sometimes irreparable, is often done by allowing a child to grow up almost entirely in the society of domestics. If parents want children to learn pleasing and polite manners, the use of good English, and refined modes of eating, they must associate their children with themselves; and if they themselves do not possess these qualities, they should cultivate them as thoroughly and rapidly as possible. In the effort to teach the child in these respects they may profitably let it appear at the general table as soon as it reaches the age of two and a half or three years, or at the most four years, unless company is present. In many cases, however, children behave much better and are more easily trained and managed if their meals are given to them at their own little tables in the nursery. Much depends on circumstances. It is a valuable safeguard against a child pushing its chair over to have this fastened in some way to the table.

Very early we should begin to teach a child not to have unreasoning fear; and one of the best means of accomplishing this is never to let it be frightened. Such toys as the jack-in-the-box and those which make a sud-

den loud noise should not be given to very young children, as they may be the cause of great fright. A child should be taught to have no fear of such things as mice, worms, and other innocent animals. It should look upon the dark as equally harmless with the light.

Too great caution cannot be used in the choice of stories told or read to little children, since they sometimes gather from what seems to be least harmful the occasion of a timidity not easily recovered from. Ghost-stories are, of course, entirely out of the question. They have often been the cause of untold mental suffering and of a fear which a lifetime has not overcome. Many of the popular fairy and other stories are quite capable of frightening nervous children. The fierce wolf of "Little Red Riding Hood," the frightful giants of "Jack, the Giant Killer," the harsh, unkind stepmother of "Cinderella," and the sad loneliness of the deserted "Babes in the Woods," may readily return as real terrors after the little one has been put to bed. Even stories which excite the imagination too vividly are to be avoided, although they may be entirely free from elements causing alarm.

Up to the age of nine or ten years boys and girls are disposed to play together unless some too officious person has made the boys dislike the girls' games, and the girls feel that the boys are rough and "horrid." No hinderance should be opposed to this joining in play, since it induces the girls to lead an active life. The mother should never forget, however, that it is important to exercise careful although unobserved supervision over the morals of the children, whether the sexes play together or separately, since even those who appear perfectly innocent are by no means always so; nor is it invariably some one else's children who are at fault. Experience shows that almost no age is too young to need the subjection to this watchfulness.

Finally, we must consider briefly the management of the *school-life* of children. With the comparatively recent improvements in schooling, children may be sent to a kindergarten by the age of three or four years. The key-note of the kindergarten is the acquiring of knowledge by play. At the same time the child is amused and learns a certain degree of discipline and order. Many of the games are accompanied by little songs and movements of the body, which are always designed to impart knowlege of some sort. Thus the child sings of the flight of birds, and imitates the flying by the motion of the arms. It learns also of the harmony of colors by weaving colored papers, and gains manual dexterity at the same time. A knowledge of number and of form comes from playing with blocks. A grain of corn may be the text for a story about growth, and the child learns a song regarding this.

These instances illustrate imperfectly the methods of the kindergarten. Whenever a good school of the kind is available, it should be utilized, and when it is not, the mother should herself devote some time daily to instructing her child on the lines indicated. There are now many excellent manuals on kindergarten instruction which give details of the method of teaching. But with some children even the simple instruction of the kindergarten may give too much mental work; for the learning of songs and rhymes is, of course, a decided mental effort.

There is really no need to teach a child to read before the age of six years. Precocity is not a thing to be desired. Indeed, in delicate children it is to be discouraged strongly. It is not the slightest indication of talent or genius. Many children teach themselves their letters, as has already been mentioned: many go further.

and learn to read with very little assistance if they have once been given the start; while still other children find study always a burden. If we have succeeded in getting the power of observation and attention well cultivated by the kindergarten object-lesson methods, reading will usually come readily enough.

By the time the child is six or seven years old it may be given some regular lessons and do some actual study, but not at the expense of health, and the hours should be very short. Three or four hours daily are quite enough up to the age of ten years. Throughout the early school-life there should be no studies to prepare at home, for the confinement of the school-hours is all that, and often more than, the health can stand. The great fault of the age as regards the mental training of children is that of over-pressure. We expect the children, with their brains still in a formative state, to do far more mental work than most of their elders do. The danger of over-study is particularly true in the case of girls, who are more disposed than boys toward a quiet, sedentary life; but both sexes must be most carefully guarded against too much brain-work. Eyes are often irreparably injured by school studies, not only as the result of insufficient or badly-placed light, but in consequence simply of too constant use. Many cases of nearsightedness are the result of the improper use of the eyes early in life, or of eyes which need correcting by glasses. Spinal curvature and the development of a habit of stooping often result from faulty methods of sitting at school (see p. 236).

It is very important in the "one-session" school that there be a recess of sufficient length to allow the child to obtain something more to eat than doughnuts and sweets. Indeed, attendance upon the best school in the world is

not worth a hastily-swallowed breakfast and a hurried, indigestible lunch. In this respect, as in all others, schooling must always be secondary to the care of the health. The value of the use of gymnastic exercises has already been referred to earlier in this chapter. Where it is possible to do so a school should be selected which provides these for the children, since they not only practise the muscles, but also make an excellent break in the tedium of the school-day and return the children refreshed to their studies.

The subject of the sending of older children to boarding-school is too many-sided for consideration here. Over against the advantage of the increased independence and self-reliance attained must be set the lack of parental and home influences and the danger of acquiring bad habits of all sorts. From a strictly medical standpoint we have chiefly to assure ourselves, in selecting a boarding-school, that the children do not pass either sleeping or waking hours in crowded and ill-ventilated rooms, that they are well fed, and that they receive abundant opportunity for exercise and sleep.

The danger of contracting contagious diseases in either day-schools or boarding-schools must never be forgotten. Unfortunately, it is one from which there is no absolute safeguard, especially since many parents are utterly reckless of the risk to other children which arises from sending back too soon their own children who have been ill. The periods of quarantine for the different diseases, which will be found in Chapter XI., should invariably be followed. Any boarding-school in which there is an extended outbreak of diphtheria, scarlet fever, or other dangerous infectious disease ought to be closed unless there are exceptional facilities for isolation and treatment.

Any other matters connected with school-life can better be treated of when we consider the School-room in a later chapter.

CHAPTER IX.

THE BABY'S NURSES.

DURING the period of infancy and childhood we may have to do with four sorts of nurses: (1) the monthly, or obstetrical, nurse; (2) the wet-nurse; (3) the child's nurse or nurse-maid; and (4) the trained nurse in case of sickness. We must briefly consider these, and the qualities to be desired in each.

1. THE MONTHLY NURSE.

Although the monthly nurse is really the nurse for the mother, yet it is upon her that the care of the baby devolves during the earliest period of its life. She it is who washes and dresses the child during the time the mother is confined to bed, and who watches its condition and reports this to the attending physician.

The choice of the monthly nurse is a matter of the greatest importance for both the mother and the baby. The physician in charge of the confinement may wish to recommend some one on whom he can depend, and in this case the entire responsibility rests upon him. If, however, the selection is left to the mother, she should choose one not so much because she knows her name as the nurse of Mrs. So-and-so as because she has, if possible, some knowledge of her real ability. Many monthly nurses, and particularly the older ones or those who have not had careful school-training—and sometimes, unfortunately, even those who have and who might be

expected to know better—are filled with all sorts of wrong ideas about the care of the new-born child. Not only so, but they consider their "experience" so great that they become obstinate and self-willed, and incapable of receiving advice or even of obeying orders. They will follow their own plans with the baby, on the ground that its care is their business, and not the doctor's. Every physician has seen instances of great damage done in this way. A truly well-trained nurse has not only been taught the proper care of the mother and infant, but has learned also that she is to modify her methods promptly and silently according to the directions of the physician in charge. Not only is ability required, but adaptability and tact as well. The nurse must know how to get on well with the domestics and with the relatives of the patient, and how to put up with inconveniences if the house is small and the family in moderate circumstances. In a nurse who combines these various requirements the mother may put the greatest confidence.

The nurse should be engaged some months in advance, and all pecuniary arrangements made in detail. It is a good plan to have her in the house a week or so before the confinement is expected, or, if this is not possible, then within easy reach, so that she may be sent for with the very first signs of beginning labor. She ordinarily stays for a month or more after the birth of the child, but so long a time is not always necessary.

It is the custom for the nurse to sleep in the room of the mother, or, still better, in the adjoining room. In the latter, too, she can take her meals if it is desirable. She is to take full charge of the baby, determining the hours for feeding, and preparing its food should the mother be unable to nurse it herself. She is not ordinarily expected to do any washing of the baby's clothes, except,

perhaps, the diapers, nor to wash her own garments. She should be able to prepare special articles of sick-diet for the mother, in case there is need for her to do so.

2. The Wet-nurse.

The second variety of nurse with which we sometimes have to do is the wet-nurse. The advantages and disadvantages connected with the employment of a nurse of this kind have already been spoken of when considering the Feeding of the Baby in Chapter VI. When it is found desirable to nourish a baby in this way the choice of the wet-nurse is a matter of great importance. Fortunately, this also can often be left entirely to the physician in charge. It is absolutely necessary that the wet-nurse be in good health, strong, and not too fat. A most careful examination on the part of the physician is required, since nearly any form of ill-health impairs the quality of the milk, and there are some diseases, such as syphilis, which can be transmitted directly from the nurse to the child at the breast. An examination of the nurse's baby is also a guide to the health of its mother and to the nutrient value of her milk.

The nurse should preferably be from twenty to thirty years of age. It is better that her own and her foster baby be of approximately the same age. It is well if her own child is several weeks old, in order that a tendency to the early drying up of the milk need not be feared, and that the milk itself may have attained a stable character. Her breasts should be firm and conical in shape if it is her first child, or only very slightly pendulous if she has had several children. They should contain plenty of milk, as shown by the ability to press some from them after the child has done nursing. They should, however, become distinctly more flabby when emptied.

If they do not, their size may depend simply upon their being covered by a large amount of fat. The nipple should project well and be free from cracks.

She should not be permitted to suckle her own child and her foster infant also. Few women have enough milk for both, and the temptation is great to give the preference to her own child.

The moral character of the wet-nurse cannot be disregarded. She should be amiable, temperate, and with a lively sense of the responsibility of her position. If otherwise, the health of the child is sure to suffer. If she gives way to violent anger, her milk may become for the time actually poisonous, and produce colic, diarrhœa, convulsions, or even more serious results. If intemperate, she may while intoxicated allow the child to suffer injury; and if she is irresponsible in any other way, she may surreptitiously feed the child with cow's milk if her own diminishes, give it an opiate if it does not sleep, neglect the care of its body in some manner, or abandon it without warning.

A married woman is to be preferred, but the difficulties connected with obtaining a good wet-nurse are so great, and married wet-nurses often so scarce, that it is folly to refuse to engage an unmarried one if she is qualified in other respects. Because she has made one so false a step does not prove her wholly bad. We must remember that we are not seeking examples of morality or instituting rewards for virtue or punishments for crime, but are simply trying to obtain a suitable manufacturer of human milk for a child who will suffer without it. This remark applies, however, only as regards the first illegitimate child. A woman who has had more than one child illegitimately will probably be depraved in other respects and be unfit to be trusted. It is only through the danger

of neglect, however, that the moral vices of a wet-nurse affect her foster child. There is no more probability of a baby imbibing the character of the nurse through the milk which she gives, much as we hear this talked about, than there is danger of a child learning to "moo" because it is fed on cow's milk. For the same reason the color of the nurse is a matter of no consequence whatever.

It is necessary to regulate carefully the wet-nurse's diet and her method of living in general, according to the principles which have been determined in a previous chapter to be of service to the health of the nursing mother (pp. 120–124). The nurse must have plenty of exercise in the open air, sleep in a well-ventilated room, and be provided with an abundance of digestible, nutritious food. At the same time we must remember that a woman taken from the lower walks of life and given unrestrained opportunity to indulge freely in food to which she has not been accustomed is disposed to eat too much and to exercise too little. Indigestion follows as a natural result, and the health of the nurse suffers and her milk diminishes or even disappears. The use of stimulants by the wet-nurse is seldom necessary. A woman whose health demands them is not in a fit condition to fill the place.

Finally, the wet-nurse must be made to adhere to the rules for nursing laid down in a previous chapter (Chapter VI.). But however well qualified the nurse may seem, a wise mother will not hand over the care of the baby entirely to her, but will exercise a careful supervision over everything that goes on, particularly at night.

3. The Nurse-maid.

The third form of nurse, and the one whose qualifications deserve especial attention, is the ordinary child's-nurse. Scarcely anything is more difficult than the

haughty answer, "I have every confidence in my nurse." Nurses are constantly seen in parks and other public places absorbed in reading, or chatting unconcernedly with each other or with some of their male friends, while the babies lie crying in their carriages, perhaps exposed to the full rays of a hot sun or unprotected from a cold wind. Many a time we may see an old woman supporting a crying child on her knee and joggling it roughly up and down to the sound of some crooning ditty until one would think that its poor little head must ache, and its teeth, if it has any, must be loose in its jaws. The bad effects of such treatment have already been referred to in the preceding chapter. How often, too, are children taken by nurses on their shopping expeditions, or even to the houses of their friends, where they are perhaps exposed to some dangerous contagious disease!

Seeing, then, how important the choosing of the nursemaid is, we must review some of the qualifications which she should possess. This applies not only to her physical qualities but to her mental and moral characteristics as well, since the child is liable to have its mind and disposition moulded largely by its nurse, and it is manifestly impossible for it to attain the traits so much to be desired if its constant pattern is the reverse of them all.

In the first place, the nurse must be in good health. The existence of any disease, and especially of consumption or other form of tuberculosis, should be an absolute disqualification. The employment of a nurse with syphilis must also be carefully guarded against. Such conditions as offensive nasal catarrh, bad breath, profuse odorous perspiration, and the like, although not actually dangerous to the child, render the presence of the nurse very unpleasant.

There is some question regarding the best age for a nurse to be. In general the age of thirty to forty-five years is to be preferred. Half-grown girls are seldom fit to have the charge of a child entrusted to them; young women are very liable to give too much attention to enjoying themselves with their friends; while old women, although sometimes invaluable, are as a class prone to be self-opinionated and forgetful. Of course there are numerous exceptions to this statement.

The nurse should be strong. If delicately and slightly built, the carrying of the baby for hours at a time will be beyond her strength. If, on the other hand, she is very stout, she will be able to do little more than support her own weight when walking. Besides, the mass of her flesh is very heating to a baby held in her arms or lap in hot weather.

The comeliness of the nurse is a matter of comparative indifference. Children are prone to think that all those whom they love are beautiful. If only the nurse loves her charge and has features not actually repelling, more is not needed. Even babies in arms perceive the loving and trust-inspiring expression and are contented.

This sincere love of little children is one of the great requisites of a good nurse. She should have chosen her work, not because it offered as good a way as any of gaining a livelihood, but because she prefers it to anything else. If the love be present, other good qualities will not be entirely wanting. A devoted nurse will not, for instance, easily lose her patience or become angry with the child, even though it is really annoying.

Two other qualities which are very important are intelligence and docility. The nurse should have sufficient intelligence to be able to understand, remember, and carry out any instructions given her, and should be docile enough to be glad to do this, no matter how much pre-

vious experience she has had. Experience is, of course, of great value, yet experience without docility is especially to be shunned. A nurse of this character is as hard to mould as a stone, and can be taught absolutely nothing. She tyrannizes the young mother, who, knowing her own inexperience, is afraid to interfere in any way. Better far an intelligent though inexperienced woman who is willing to learn.

Truthfulness and conscientiousness on the part of the nurse are greatly to be desired, but, unfortunately, far too rare. How is it possible for a child to be taught by its parents the sin of lying and the importance of obedience if it constantly hears its nurse telling falsehoods and sees things done which have been positively forbidden? Then, too, the baby may be saved much suffering if the nurse has the courage to admit when she does not know, and to report promptly any alteration in the child's health or any accident which may have befallen it, even though this may have been the result of her own carelessness.

A cheerful and lively disposition is very important, particularly when the baby reaches the age when talking commences. It sometimes happens that a child's mental faculties develop very slowly if it is much with a nurse who is very quiet and makes no effort to teach it, but that they at once take on a rapid growth when one of a different nature is substituted.

The possession by the nurse of good manners and gentleness of disposition, and of a control of good language, is of great advantage when it can be obtained. Children will thus learn instinctively to be polite and kind. A rough, boisterous, ill-mannered child is the natural outcome of association with a coarse-natured, loud-voiced nurse. Yet mothers often seem to overlook this very obvious fact.

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Having dealt with the nurse's qualities, we have still to consider, first, the nurse's duties to the child, and, second, the mother's duties to the nurse.

The nurse is generally expected to take as complete charge of the child as the mother chooses. She washes and dresses it, prepares its food if it is on the bottle, and takes it out for its airing, either in her arms or in the perambulator as the mother wishes. She sleeps in the room with it and attends to it at night, or, if the baby sleeps in the mother's room, arises when called and gives it any attention that may be required. She reports promptly the slighest evidence of illness. As the baby grows she endeavors to train it mentally and morally, enforcing obedience, politeness, neatness, and the like, on the lines already indicated. Possibly the repairing of the child's garments is assigned to her.

There are certain things which the nurse should be distinctly instructed that she shall *not* do, and some of these "dont's" the mother may profitably take to herself as well. She should never be impatient or cross with the little one. She should never omit to say "please" and "thank you" if she asks a favor of the child, else the use of the words on its part cannot be expected. She should never use harsh commands or rough language of any kind. She should endeavor to exact implicit obedience on the part of the child, but she should also never show anger or take the punishment into her own hands, except such harmless, not corporal forms as the mother distinctly permits—for example, the taking away of a doll, the making to sit in a corner, etc., but *never* the shutting in a dark closet. She must never give any object to a child old enough to talk simply because it cries for it, but must insist upon being asked politely for it. She should teach a child to have no fear

of harmless objects by herself never showing fear. She should never allow the child to see terrifying sights or frighten it in the slightest degree. A nurse who tells a child a ghost-story or who makes it fear the dark is little short of a criminal, and deserves to be punished as such.

On behalf of all physicians, since their labors with children are not easy at the best, I do strongly urge that neither mother nor nurse ever hold up the doctor as a bogy who will give some bad medicine or take the child away if it does not obey some command which has been given. Such a course destroys the child's trust in and fondness for the physician, and renders his examination and treatment of it when sick far more difficult.

The nurse should never administer a particle of medicine unless told to do so by the mother, never under any circumstances give any article of food or drink to which the child is unaccustomed, never give food solely for the purpose of quieting a child if crying, and never allow it to drink out of a public glass or cup. She should never start the flow of milk from a nursing-bottle by sucking at the nipple, and never cool the food of an older child by blowing on it. She should never use baby-talk to a child learning to talk, as this retards its acquiring of distinct speech.

Finally, she must never allow the baby to lie or sit in the hot sun or in a windy or damp place, and she should not take it into a shop or a private house without the mother's consent.

What, now, are the mother's duties to the nurse?

Chief of all is that of paying her well if she is worth it—and she should not be employed if she is not. The baby is far too precious to allow of hesitation in this matter. The mother should avoid imposing work upon her which does not belong to her, for if she is a faithful nurse

she will have enough to do to attend to her own duties. She should see that the nurse has full opportunities to do her shopping and to visit her friends unattended by the baby, since this removes the temptation of taking it with her. While openly assuming the entire direction of the baby's life, and secretly watching that her instructions are properly carried out, the mother must show no sign of distrust, and must endeavor to enlist the interest and win the affection of the nurse.

Finally, she must act with the nurse, and not against her, in the management of the children, always upholding the nurse's authority before them, even though she afterward explain to her in private that she differs with her, and wishes in the future that some other line of action be pursued.

A word with regard to French and German nurses. If it is a difficult matter to find a thoroughly good nurse among the large number of English-speaking nurses, how much more among the much smaller number of French and German ones who present themselves! If a mother desires to employ one of foreign race, she should first of all see that she has the qualities of a child's nurse. That the child learn a foreign language is far less important than that it be well cared for in body and mind. Moreover, there is a very strong temptation, hard to resist, to insist upon the child spending almost all its time with the nurse, in order that it may have the greatest opportunity to acquire her language. No mother who loves her little one can afford to run the risk which this entails.

4. The Trained Nurse.

The nurse trained especially for the care of the sick is the last one of the baby's caretakers to whom we must

turn our attention. In cases of slight illness, or even in more serious disease, the mother with the help of the nurse-maid may be able to carry out the directions of the physician without outside help. Often, however, this is almost impracticable. A sick child demands the constant attention of some one, and it is frequently an utter impossibility for a mother to attend properly to the patient and to look after her other duties. Moreover, of all things experience is to be desired in the care of sickness, and a young mother has usually had no chance to acquire it.

Fortunately, in many of the larger cities a skilful trained nurse can now be readily obtained. Such a nurse is more than a luxury. She brings with her the greatest comfort to the inexperienced mother and increased chances of recovery to the child. Unless the expense absolutely forbids, every child who is or who is likely to become seriously ill should promptly be provided with a trained nurse. A good nurse is just as important as a good doctor—yes, even more so, for the skill of a doctor cannot avail unless his directions are carefully carried out. The mother's anxiety and her disposition to yield to the child's wishes greatly interfere with her judgment and her ability to nurse properly. It is often astonishing how a child, generally rebellious to parental control, will yield readily to the desires of the trained nurse, if only her management be not interfered with. The nurse, as a stranger, awakens a certain degree of respect which the poorly trained child has often unfortunately ceased to have for its parents.

The employment of a nurse, however, does not mean that all authority is to be taken from the mother. The child is hers; her duty to it remains the same, and she is still mistress in the house. The nurse is her employee,

and will obey her directions if she gives them. At the same time, the nurse is directly answerable to the physician, and dare not, if she is faithful, disobey his orders. As she has been engaged to assume the responsibility of the nursing and to exercise her trained skill in the care of the child, the mother will be chary of interfering, unless she sees to a certainty that things are not going well and that the nurse is not as competent as she ought to be; and even then she had better talk the matter over with the physician first. Unfortunately, not all trained nurses are really helpful. Some are lazy, or indifferent, or untrustworthy. Some are so busy maintaining their own dignity that they are a burden to the household and a hindrance rather than a help. This does not, however, mitigate against the value of trained nurses as a class. A really good one—and there are many—is a help indeed.

The special qualifications of a trained nurse are beyond the province of this volume, and can be referred to but briefly. The nurse should have been thoroughly taught in a training school connected with a good hospital, and she should have had special experience in the nursing of sick children. Many a nurse is excellent with adults, but does not possess the peculiar knack of caring for a sick child. An old woman who has merely gathered together a lot of useless or harmful theories and practices may have had a deal of "experience," but it may only have confirmed her in her fatal mistakes. Such a woman is to be avoided carefully. She is no more a trained nurse than an "herb doctor" is a physician. This by no means implies that all elderly women without hospital training are worthless, for many of them are excellent. Still, a hospital nurse is usually to be preferred.

A trained nurse should be strong, docile, alert, self-possessed, and gentle of hand, step, and voice. She

should be neat in appearance and very clean. She should also be able to adapt herself readily to the disposition of the patient and to the various conditions existing in the household. She should wear wash-dresses, slippers, and a nurse's cap, all of which are not intended as a mark of her office only, but have their distinct purposes of cleanliness and quiet as well. Her experience should have taught her to observe carefully the different evidences of disease, which we shall study in a later chapter, and to understand to a considerable extent what they indicate. If she has been well trained and is capable, she will at once take charge of the ordering of the sick-room and the diet of the patient, and will inspire a feeling of relief in the mind of the anxious mother—and of the doctor, too—such as no words can express. She will see that the child's food is prepared properly, and it is her duty even to go into the kitchen and to prepare it herself if it cannot be managed otherwise. Of course this cannot be done in cases of contagious disease, since she must then not go through the house to any extent. In diseases of this nature the nurse cannot associate with others of the household. She must sleep and eat in the sick-room or in an adjoining room connected with it, and she should pass through the house only on her way out for her daily walk, stopping to talk with no one and entering no other room. In preparing to go out she should wash her hands thoroughly with carbolized water (Appendix, 97) and change her slippers for walking-shoes and her wash-dress for her street-gown. After the disease is over she will take the proper steps for disinfecting the room. These will be described in Chapter X.

If a mother is herself nursing a child with an infectious disease, she must separate herself absolutely from her

other children, and follow in all respects the rules given for the conduct of the trained nurse.

Further remarks on the duties of the trained nurse will be found in the chapter on the Management of Sick Children (p. 250).

As with the nurse-maid, there is a duty of the mother to the trained nurse. The nurse is not made of iron, as seems often supposed, and if she is to accomplish the best results for the child she must have regular times for sleep and outdoor exercise. Worn out by watching, she may easily overlook her duties, administer the wrong medicine, or make some other serious blunder. In their interest in their patients nurses frequently forget this fact. The mother must see that the nurse takes sufficient sleep and fresh air, that she is well fed, and that her garments are laundered for her.

In very severe and prolonged cases two nurses are needed, or the mother must arrange that she or some one else take turns with the nurse.

CHAPTER X.

THE BABY'S ROOMS.

HOWEVER much we may desire to select rooms for the baby according to some definite fixed rule, such an arrangement is manifestly impossible unless we build a house to suit the baby, and then occupy it uninterruptedly. Frequently not what is best, but what is possible, is the plan which must be adopted. This applies particularly to those occupying hotels or boarding-houses, but even also to householders to a considerable degree. The advice given in this chapter is intended to be followed as closely as circumstances will permit.

The baby's first room is, of course, that of the mother. Here it was born, and here it will probably remain until it is several weeks old at least. Later, two rooms should be provided for its occupancy—the one for its waking hours, and the other to sleep in at night and when taking its morning and afternoon naps. These rooms must be selected with the greatest care, as they are the most important in the house. As the child grows older the selection of other rooms is to be considered—namely, the sick-room and the school-room. The principles which govern the choice of any of these rooms are to be applied as far as possible even when the children are obliged to share their rooms with other members of the family.

1. The Day Nursery.

The position of the day nursery is a matter of much moment. As the family can rarely undertake to provide one nursery for summer and another for winter, the selection of the room must be made with reference to its suitability in winter-time, since in warm weather the child will be nearly the entire day out of doors, or very possibly with the family at a summer resort. It is necessary, therefore, to choose for the day nursery the brightest, airiest room in the house. Sunlight in the room is of inestimable value, remembering, however, that the new-born baby cannot stand a bright light without injury to its eyes, and that at this period they must be properly shielded. The exposure should preferably be south. If this cannot be had, a room with a window looking east is rather better than a westward outlook, on account of the presence of the morning sun. A corner room with large windows opening south and west is the ideal one. Indeed, there should always be more than one window if it can be had. In the warm season the

heat of the sun can be modified by the use of blinds or awnings. There may be difficulties connected with the heating, or some other conditions which render a certain room undesirable, although the exposure is all that can be wished. Naturally all the various circumstances must be taken into consideration.

The nursery should not be upon a level with the ground, as it is apt to be too damp. The third story is the best, provided it is not directly under the roof. More light, air, and dryness can usually be obtained at this elevation, while the noise in the house is less liable to disturb the nursery, or that in the nursery to annoy the rest of the house. The room should have as much air-space as possible. There ought to be from 500 to 1000 cubic feet for each individual occupying it. The number of cubic feet is easily calculated by multiplying the length of the room by its breadth, and the result by the height. Estimating 1000 feet as the supply required for each person, a room 10 feet high, 15 feet wide, and 20 feet long would accommodate two children and the nurse. This does not, of course, mean to the exclusion of proper ventilation, and as the number of inmates is often greater than this, and the room no larger, or even smaller, ventilation must be still more carefully attended to.

The ventilation and heating of the room is often a difficult problem. Proper ventilation consists in providing a constant and abundant supply of fresh air, yet without draughts. A house built to accomplish successfully both heating and ventilating will supply fresh warm air and will remove through ventilators the air already used without the necessity of opening a window. Few houses, however, are constructed in this way. In a dwelling as ordinarily built without this system, an open fire-

place will furnish a method of removing air that is unexcelled, except that it is prone to create draughts upon the floor, which must be particularly guarded against.

Where there is no fire-place a ventilator connected with a chimney may be put in the upper part of the wall and the foul air removed in this way. Furnace heating through flues and a register supplies fresh warmed air from without. If fresh air must be admitted from a window, it is very important to have it done in a way to avoid draughts. This may be accomplished by the use of an ordinary ventilating-board, which consists of a board 4 to 6 inches high, made to fit accurately below the lower sash, which is closed upon it. In this way air

FIG. 66.—Window ventilator: view from inside the room.

is admitted between the upper and lower sashes. In place of fitting under the lower sash the board may be 10 or 12 inches high and may be placed against the inside of the window-frame. If the lower sash is now raised 2 or 3 inches, air enters below and is directed upward between the sash and the board, at the same time that it also enters the room between the sashes, thus producing two currents. An improvement upon this arrangement is the apparatus shown in the illustration (Fig. 66). The pipes, of which the bent portion is upon the inside of the room, serve to direct the cold air upward and thus to prevent draughts. By a damper in each the

amount of air entering can be regulated at pleasure. The board itself is of two pieces which slide upon each other, thus allowing the apparatus to be fitted under the sash in a window of any breadth. This ventilator can be obtained of any large hardware or house-furnishing store. Another apparatus sometimes used is the revolving-wheel ventilator, which may be set in one of the upper window-panes, and is made to rotate by the passage of the air through it. A wooden frame covered with cheese-cloth or thin muslin, and made to fit in the window like a fly screen, admits air freely but checks draughts, and is sometimes useful.

Besides this constant ventilation the room must be aired thoroughly with wide-open windows once or twice a day, at a time when the child is absent, and then be well warmed before it is used again.

For heating the nursery probably nothing as yet takes the place of a good hot-air furnace, since this is both easily controlled by opening or closing the register, is more efficient in cold weather, and aids ventilation by supplying fresh warm air from without. The air, it is true, is often too dry, particularly when the ordinary furnace supplied with drums and hot-air chamber is used. It is also liable at times to carry coal-gas with it. Air coming through flues from over hot-water pipes is probably preferable. The dryness may be modified to a certain extent by placing vessels containing water immediately in front of the register.

It is a good plan to have the registers rather high in the wall, as this puts them where they cannot be touched by the children, and tends also to prevent draughts.

Heating by steam radiators is very effectual, but more difficult to control; moreover, it fails to aid sufficiently in ventilating. Gas stoves should never be employed unless

they are supplied with smoke-pipes connected with the chimney or passing through a hole in the window or wall, as otherwise they fill the air with the products of combustion. The open fire-place is the ideal form of heating in moderately cool weather, although wasteful of fuel. In severe weather, however, it heats too unevenly, making one portion of the room very hot and leaving the rest cold. The ordinary air-tight coal stove is very serviceable for heating, but is of little use for ventilation. Certain stoves of special manufacture supply ventilation as well as heat. It is very important that stoves, fireplaces, hot registers, radiators, and all lights in use be so guarded that there can be no possibility of the baby burning itself. A couple of thermometers should be placed in different parts of the nursery, away from the windows or the heating apparatus, and one of them should certainly be near the floor, since the air is often so much cooler there, and a child's whole body is so much closer to the floor than an adult's is. The temperature ought to be kept as uniform as possible, 70° F. being the extreme of heat allowed, and 66° to 68° being a much better temperature.

In this connection must be mentioned the fact that in cold weather there is always a draught of air from a window, even when closed. Weather-stripping will prevent some of this, but the greater part of it is due to the chilling of the air by the cold glass. This is remedied to a considerable extent by the use of double sash, but, as it is not entirely hindered, it is better in very cold weather not to allow the child to play near a window, and perhaps not upon the floor at all.

The furnishing of the nursery should be of such a nature that cleanliness can be strictly enforced, particularly if the room is to be used at any time as a sick-room.

The floor should be well made, with the boards closely joined and smooth, all the cracks and holes stopped with putty, and the whole painted or, still better, finished with varnish or oil in the natural wood, but not made slippery. If the floor is old and poor it may be covered with oil-cloth. Carpeting of some sort is an essential, but it had better not be tacked to the floor. If made in the form of one or more rugs, both they and the floor can be cleaned more easily.

The walls of the room are best painted a bright, cheerful tint, and the ceiling likewise. If paint cannot be used, a wall-paper may be chosen which can be washed. Paper of this nature, coated with a waterproof varnish, can readily be obtained. It will bear sponging with plain water, but soap may injure it. The wall-paper ought not to contain colors made with arsenic, and any old paper ought to be removed previous to repapering. Some large open shelves against the wall are a very great convenience. Bright-colored, cheap pictures may adorn the room. More expensive ones are to be tabooed, since circumstances may arise, such as the occurrence of some contagious disease, which may render it advisable to destroy them.

An important matter is the fitting of all windows with firm bars to prevent the children from falling out. There should also be a swinging or sliding gate in the doorway to keep the baby from reaching the stairway. The latch to the gate must, of course, be out of reach, on the side away from the nursery.

The furniture of the nursery should be strong, light, plain, and easily cleaned. Upholstered pieces are not desirable. Both large and small chairs, with and without rockers, are needed, and a low table at which the children can play and, if desired, take their meals. None of these articles should have sharp corners, and the rock-

ing-chairs are better if of the swinging style without visible rockers. There is also needed a "nursery chair" (Fig. 67)—a little wicker or wooden chair with a hole in the seat and a place for the proper vessel below. This chair should never be used for any other than the one purpose. Some tall light-screens are very serviceable articles for the cutting off of lights and draughts.

FIG. 67.—Nursery chair.

Much of what has been said sounds as though the nursery were to be a bare and ugly room, but this is far from being the case. There is a large range for the exhibition of taste in furnishing. The rugs may be as pretty as one wishes, although they had better be inexpensive. Painted walls can always be made to look well if the tints are good. In addition, the room may be provided with a canary bird, the pictures referred to, a globe of gold-fish, some growing plants, and similar objects. Such a nursery, when occupied by a child happy with its toys, cannot but present as pretty a sight as one could desire. It may be said here that growing and flowering plants, with possibly the exception of those producing a heavy odor, are never injurious in the nursery, either by day or by night, and are perhaps even beneficial.

The nursery should be kept scrupulously clean. Besides the daily dusting, the rugs should be taken up once a week, and the floor, as well as the furniture and woodwork in general, washed with a damp cloth. The wiping off of the walls from time to time must not be forgotten. No food or empty dishes or nursing-bottles should be allowed to stand about, and soiled diapers or receptacles containing urine or evacuations from the bowels must be

promptly removed. Closets should be inspected frequently, lest something unpleasant have been put away in them. In fact, every precaution must be taken to keep the air sweet and clean.

The effort to preserve the air pure suggests the question regarding the stationary wash-stand. There is a great prejudice among many against them. A well-trapped stationary wash-stand fitted with the best modern traps, and with additional careful trapping of the main drain-pipe of the house before it passes to the sewer, is probably entirely devoid of danger if flushed often and if inspected by a good plumber at frequent intervals. Nevertheless, since severe sickness is believed to result from draining which is not so perfect, it is sometimes thought better to have no plumbing at all in either the day or the night nursery. A wash-stand of doubtful plumbing may either be plugged with putty or, still better, cut off from the sewer. Any wash-stand may be made perfectly safe by having it empty through a special pipe not connected with the sewer in any way. It may, for instance, discharge into the rain-water pipe from the roof, provided this does not join the sewer, as so many of them do. The latter arrangement would be far worse than the ordinary one.

Wash-stands should be kept perfectly clean, and never used as slop-sinks. They should be washed frequently with a strong soda-solution, ammonia, or a solution of copperas or carbolic acid (Appendix, 97). This will deodorize the pipe on the room side, but does no good whatever as a disinfectant if the plumbing is imperfect.

2. The Night Nursery.

In the numerous cases in which a family cannot arrange to set aside a room especially for the night nursery, the children must sleep either in the day nursery or in the

mother's room. Indeed, where there is but one child a night nursery is hardly needed, but where there are several children in the house, attended by a nurse, it is a very great convenience. The night nursery should be used whenever the children sleep, whether by night or by day. The qualifications necessary for it are to a considerable extent those desirable for the day nursery. Since it is so strongly advisable that a mother keep some watch over her children at night, the night nursery ought to be somewhere near the mother's room—indeed, connected with it if possible. Ventilation must be provided for at night in the manner already described for the management of the day nursery. The sleeping-room should also be thoroughly aired after each occasion on which it is used, and then warmed again to remove all traces of dampness. The temperature at night should be maintained at 60° to 65° F. It is generally thought best not to throw the windows widely open and to allow little children to sleep in a very cold room. Many physicians, however, approve of this course.

The furnishing of the sleeping-room is similar to that already described for the day nursery, as regards the floors, walls, carpet, and the simplicity of furniture. There should be in it several chairs, a bed for the nurse, and one for each of the children. The beds must be carefully placed to be out of all draughts. The use of folding screens is often a great aid to this end.

The bath-tub and other articles for the toilet may be kept either here or in the day nursery, according as it is found most convenient to make the children's toilet in the one or the other place. This applies also to the chest of drawers which contains the clothing, and the low chair upon which the nurse sits when washing and dressing the child. Should the night nursery be used for the morning

toilet of the children, the temperature should be elevated to 68° or 70° F. before it is performed.

In the lighting of the night nursery it is to be remembered that the burning of any ordinary light consumes a great deal of the oxygen of the room, besides filling the air with harmful substances. One ordinary gas-burner uses per hour as much pure air as several adult persons. Nevertheless, artificial light of some sort is a necessity in the early mornings and late afternoons of winter. Gaslight is probably the least objectionable kind ordinarily to be had, but if the gas furnished is of bad quality the products of its combustion will be more than usually harmful. In such case oil lamps or candles should be used—as, of course, they must be where there is no gas in the house. Ordinarily, oil is not to be preferred, because it is much more dangerous from the chance of the lamps exploding or of being upset by children. When it is possible to do so, it is a good plan to have the lights placed immediately beneath a pipe which is connected with the chimney. This will carry off the products of combustion, although it does not, of course, prevent the consumption of oxygen. Nothing equals electric lighting for the nursery, since it is not only less hot, but consumes no air at all, and is destitute of danger to the children.

It is important that the sleeping-room be in a part of the house where quiet can be preserved. Infants are very easily roused by noises, and the sleep is disturbed even if not entirely driven away.

While the child is sleeping in the daytime the room should be darkened. It is better that children be accustomed to sleep without any light in the room at night. Should it be found necessary to have a light all night long on account of the frequent rousings of the baby, a

night-lamp of some kind is the best. Different forms of this may be obtained at the drug-stores (Fig. 68). They are so constructed that they will continue to burn faintly during the entire night, and they consume a minimum of the oxygen of the air. A good form is provided with a small glass chimney, which has the advantage

FIG. 68.—Pyramid night-light.

of protecting the flame from currents of air and making it steadier. The light is furnished by a small candle, about an inch and a half in height and breadth, which is surrounded by a thin layer of plaster of Paris to ensure entire safety. A dark metal shade with an opening on one side only may be fitted over the night-light to keep the rays from falling upon the sleeping child. When a house is provided with an electric current an electric lamp of special device, giving but one candle power, can be used as a night-light, or the ordinary electric lamp may be partially covered by a dark screen.

3. THE SICK-ROOM.

Ordinarily, either the day or the night nursery must serve as the sick-room as well, the choice between them

depending upon circumstances. Where, however, one of several small children in a family is taken seriously ill, quiet and careful nursing are required, or, perhaps, isolation on account of the disease being of a contagious nature. It is then almost a necessity to choose some chamber to serve as a special sick-room for the time being. The following description is of a sick-room suitable to meet the requirements of contagious diseases in particular:

The room should be large and airy, with plenty of sunlight, unless the condition of the child's eyes or of its nervous system renders light objectionable. All the old ideas about the "darkened room" as appropriate to sickness are things of the past among intelligent people. Even when the eyes are inflamed a great degree of darkening is not needed if a screen will serve to give sufficient protection. The room should be at the top of the house, if possible, and on an entirely different floor from that containing rooms occupied by other members of the family, particularly children. All unnecessary articles of furniture should be removed, and pictures, curtains, and carpetings put away if they have any value. Chests of drawers and closets in the room should be emptied of their contents. If it is desirable to keep the apartment from looking bare, some cheap curtains may be placed at the windows, and one or two old small rugs or pieces of carpet be laid upon the floor. These may be destroyed when the illness is over. Great care must be taken to preserve strict cleanliness. The floor and furniture should be wiped off with a damp cloth at frequent intervals, but no sweeping can be permitted. No empty dishes with remnants of food and no offensive substances can be allowed to remain.

It is difficult, and sometimes impossible, to prevent the

disease from spreading through the house. Certain precautions regarding the room are necessary, but to be of value they must be of a radical nature. Vessels containing so-called "disinfectant" substances standing about the room are absolutely useless, and simply serve to make a bad smell. If the house permits of having another room, large or small, opening into the sick-room, the task is much lighter. A sheet constantly moistened with a disinfectant solution (Appendix, 97, 99) should be hung at the outer doorway of this anteroom, and the door be kept closed. Whether such a sheet actually does any good is often questioned. As it can do no harm, and may perhaps stop the egress of some of the disease germs, its use is advisable. The windows of the anteroom may be kept open most of the time if the weather permits, and in this room all plates, forks, spoons, nursing-bottles, etc., that have been used may first be washed in ordinary water and then placed in a disinfectant solution for a time (Appendix, 97). There should be in this room a wash-tub filled with this solution, in which all linen used about the patient or the bed can soak for some hours. After this it may be wrung out and placed in a bucket, and can then be carried to the laundry without danger to the household. Immersion in boiling water kills all germs. Warming of milk or the preparation of any liquid articles of diet may be done in the anteroom, and anything brought from the kitchen or elsewhere in the house may be received by the nurse at the door of this room and then taken to the sick-room.

When the illness is over the sick-room and anteroom must be thoroughly disinfected. The floors must be washed with carbolic acid or corrosive sublimate (Appendix, 97, 100, 101), and the walls and ceilings, if painted, be treated in the same manner. Paper on the walls, if it cannot

be washed, should be removed and replaced by new. The furniture and bedsteads should be washed with the disinfectant solution—avoiding, however, the use of corrosive sublimate upon metal. The disinfectant solutions are very poisonous if swallowed, and must be used with care. Toys and, especially, books which have remained in the room should be destroyed. If the mattresses and pillows are well renovated by *steam* and re-covered, they are entirely safe, but if they are small and old and can well be spared it is best to destroy them. In some of the larger cities the health authorities will undertake the thorough disinfection of articles of this kind. As a final additional precaution in disinfecting the room, it has been the custom to burn sulphur in it, although it is still disputed how effectual this is. The health authorities will attend to this also if desired, but the nurse or mother can do it just as well. Sulphur fumigators come already prepared for the purpose, and with printed directions. They may be had of the leading druggists. In place of these the broken roll sulphur may be placed in a tin vessel, slightly moistened with alcohol, and ignited. Three pounds of sulphur are required for every thousand feet of air-space in the room. The windows of the room should be closed tightly, and all the cracks about them and the doors, as well as the key-hole, stopped with cotton or paper. The pan of sulphur is then floated or supported in a tub of water to prevent setting fire to the floor, the sulphur is ignited, and the door closed. If the sulphur fumigators are employed, the box should be placed in a dish half filled with earth. After at least six hours the door may be opened, the sashes raised, and the room well aired. If it is not possible to have the mattress and pillows steamed, they should be left in the room during the fumigation, first partially opening them

so that the fumes of the sulphur may penetrate them better.

As the disinfecting power of sulphur vapor is, however, never very certain, a much better plan is the disinfection of the room by formalin, which is without doubt much superior as a germ-destroyer. This may be volatilized over a special lamp, for sale by druggists, or may be procured in the convenient form of formalin candles. Two and a quarter ounces of formalin are required for every thousand feet of air space. Yet even formalin vapor has but slight penetrating power, and articles which are to be disinfected must be thoroughly exposed to it.

The requirements of the sick-room are, of course, modified somewhat if the disease is not contagious. There is no need of an anteroom or of moistened sheets and the like. It is still useful to have the room well out of the way if the disease is one which demands quiet, and it is just as well, too, to have no unnecessary furniture in it. The practice of covering tables and shelving with all the bottles and boxes of medicine which have been in use since the illness began renders the room very unsightly and adds greatly to the evidence of sickness, besides opening up the possibility of giving the wrong remedy. Medicines no longer required should be removed entirely, and those still in use should be concealed in a convenient place.

The ventilation and heating of any sick-room are matters of the greatest difficulty. While fresh air is even more important than during health, yet in many diseases the child is peculiarly susceptible to draughts and to changes of temperature. Very often the same method of window ventilation can be employed in the sick-room as recommended for use in the nursery, provided the bed be carefully protected against draughts. Sometimes additional ventilation may be secured by covering the

patient entirely with the bed-clothes and opening the windows wide for three or four minutes. This plan, however, makes a sudden alteration of the temperature of the room, and is dangerous in many diseases. It should not be done except by the advice of the physician. In some cases, as in measles, scarlet fever, or any disease of the lungs or bronchial tubes, it often seems impossible to open the windows in the slightest degree without danger of giving the child cold. Where there is an open fire-place or a good ventilator in the room the difficulty is largely solved, as either of these will serve to provide sufficient ventilation, the pure air entering by the cracks of the windows and doors; but even with this method we must be on the lookout for draughts, so susceptible to them do children with these diseases become. The existence of currents of air can be sought for by going about the room with a lighted candle or a burning match and testing the cracks of doors, windows, closets, wash-boards, etc. It is not that we wish to stop all entrance of air from these places, since that would interfere with the foul air going out. It is only necessary that we discover where the air currents are, that we may place the bed so that it is not exposed to them. In the absence of a fire-place, in these susceptible cases, ventilation must be procured from an adjoining room where the air is kept fresh and warm.

As a means of rapidly deodorizing a room, the burning of aromatic fumigating pastilles, to be procured in the drug-stores, is very serviceable. Burning of coffee has much the same effect. Of course, nothing of this sort in any way takes the place of ventilation.

In some diseases, particularly those of the throat or the lungs, it may be desirable to have the air kept constantly moist. This may be accomplished by boiling water in a flat, shallow pan over an alcohol flame. If it is desired

to bring the moisture still closer to the child, water may be boiled in a kettle, and a tube connected with the spout may be brought close to the face, taking care, however, that it is far enough removed to avoid too great heat. We do not desire to give the child steam, but water vapor. An apparatus for this purpose, known as the *croup kettle* (Fig. 69), may be purchased from the

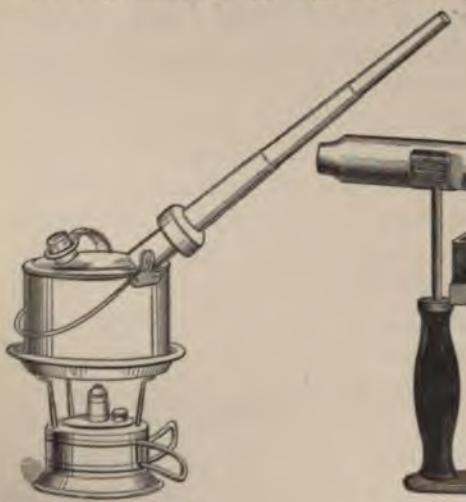


FIG. 69.—Croup kettle.

FIG. 70.—Steam atomizer.

instrument-maker or druggist. The alcohol pocket stove, with asbestos filler and wire gauze cover (Fig. 57, p. 155), is a safer lamp than that shown in the illustration. A very satisfactory apparatus for producing moisture in the room is the steam atomizer, for sale by druggists and instrument-makers (Fig. 70). The bringing of the vapor close to the patient is aided still further by draping blankets over the bed to form a "*croup tent*," so that they fall down well about it, and are open at one side only, like a tent door (Fig. 71). Broom-handles fastened upright, one at each corner of the crib, and connected by a cord at their tops, form a framework of the proper height to support

the tent. Sometimes a croup tent may be improvised by fastening an open umbrella over the child in bed and draping the blankets over that. Where it is desired to make the vapor aromatic with such substances as turpen-

FIG. 71.—Croup tent.

tine, oil of pine, oil of eucalyptus, and the like, the best way is to pour these into the shallow pan of boiling water or the croup kettle referred to, being careful to avoid the flame. (See Appendix, 103.) Accidents from fire may easily occur in using a croup tent unless precautions are taken. Many alcohol lamps are apt to flame up badly. On that account the asbestos alcohol stove described is to be preferred or, still better, a gas flame from a Bunsen burner or a little gas heater. The coverings of the tent consist of blankets on account of the inflammability of sheets.

The temperature of the sick-room should be very uniform and should be about that of the day nursery. When

the air is being kept constantly moist the temperature should be slightly higher.

In the sick-room or in the day nursery or night nursery there should be a medicine-chest or wall-closet. Here should be placed such remedies and appliances as a mother is justified in using herself. A list of articles which should be constantly kept in the medicine-closet, ready for use in cases of emergency, will be found in Appendix, 116. No dangerous medicine should be placed in this closet, except under special precautions. Bottles containing laudanum, paregoric, belladonna, or other poisons, or any fluids to be used externally should never be placed here unless of such a nature that they may be recognized readily even in the dark. If this precaution is not followed, some dreadful accident may happen. A "poison-guard" may be had in the drug-stores. It consists of a little wooden ball with a chain attached (Fig. 72). It is to be fastened to the neck of the bottle, and serves to call attention to the fact that the contents are dangerous, or only to be used externally. There is a still better device, consisting of a bottle moulded with points projecting after the fashion of cut-glass (Fig. 73). The dangerous nature of the contents is perceived the moment the hand touches it. All the household medicines and the articles for use in emergencies should invariably be kept in the closet, and nothing else should be placed there. In this way there will be no confusion when a mother wants anything in a

FIG. 72.—Bottle with poison-guard.

FIG. 73.—Poison-bottle.

hurry. Do not keep all the half-used medicines remaining from what the doctor has ordered at various times. A few of them might be of service in the future, but the majority were good only for the occasion when ordered, and the closet will soon be filled to overflowing with them. Do not forget to keep the closet locked, and the key in a safe but accessible place. I have known of a little child, with a fondness for "playing doctor," seriously drugging the baby of the family as a result of the neglect of this precaution.

A very serviceable article for use in the sick-room or nursery is a small nursery refrigerator, which serves to keep ice or milk or other foods during the night. As ordinarily made this consists of a small metal vessel, eighteen inches or two feet long, with the lid, bottom, and sides of two layers—the outer one of tin and the inner of zinc—with a narrow space for air or some non-conducting packing between them. The food should, however, be kept directly upon the ice rather than in the separate compartment. The Calcutta cooler may sometimes be used in place of a nursery refrigerator. It consists of a cylinder covered with a porous non-conducting material, and large enough to hold a piece of ice and one or two bottles. A simple method of retarding the melting of ice is to put it into a tin or wooden pail, around and rising above which is a hood of several layers of newspaper. The paper is gathered together and tied above the ice.

Some arrangement for the heating of food at night is serviceable during illness. There are various appliances made to fit over a gas-jet or on the chimney of an oil-lamp, and upon which a cup or other vessel may be heated. In place of these a small alcohol pocket-stove can be procured. A vessel for warming the food has been described on page 155.

4. The School-room.

Unfortunately, the furnishing and the regulating of the school-room are generally beyond our control. We cannot here consider at length the method of constructing a school-building to furnish the proper light, heat, and ventilation so greatly to be desired. It is certain that colds, near-sightedness, backache, headache, spinal curvature, and various nervous derangements may be expected as the result of a defect in the hygiene of the school-room, even though no mental overwork be indulged in. If the nursery with two or three inmates should be well ventilated, how much more important is the ventilation where a large number of children are collected in one room! Parents should refuse to send their children to a school, however desirable in other respects, if it is plainly apparent that there are going to be constant draughts on the one hand or great lack of proper air-space on the other.

In rural districts, or even in the city, parents who employ a nursery governess may prefer their children to be taught at home. In such case the day nursery will often be the room chosen, and its fitting qualities require no further comment. In other instances several families may combine in the employment of a governess, and will desire to select in one of the dwellings a room which will be suitable for the purpose. On this account a few remarks will not be out of place upon some of the requirements of the ideal school-room, as well as upon some of the dangers of an unsuitable room. They may, indeed, be useful even to those whose children regularly attend school, since the subject is one with which we all should be somewhat familiar. One of the most important considerations in this connection is the danger of the production of spinal deformity. A lateral curv-

ature of the spine is likely to develop, especially in girls with weak muscles, as the result of sitting in school without proper support to the back, or of improper position assumed while writing or while standing at recitation. To avoid this deformity it is important that the child stand squarely upon both feet when reciting, and especially that the desk and chair be of a proper kind. Many of these are very harmful, and produce a habit of stooping with rounding of the shoulders that may never be recovered from. The chair should allow the child's feet to rest upon the floor, and should have a back which thoroughly supports the *lower* portion of the spine. This latter feature is of the greatest importance, but is very frequently wanting. The upper part of the chair-back should slope slightly backward to support the remainder of the spine when the child is at rest. In some excellent chairs the chair-back does not extend as high as the shoulders, since no need of support is felt if the hollow of the spine and the part below it are properly sustained. The low-backed chair is the only form that gives support when the child is writing, since it may be kept close to the desk without the elbows hitting anything behind them.

The desk-lid is often too high, and as a result the right elbow is too much elevated. This produces a twist of the spine, which after a while becomes permanent as a lateral curvature. (Compare illustration on page 303). The edge of the desk-lid nearest to the child should reach only just as high as the elbows, and should overlap the edge of the seat. The child should face the desk squarely, with both arms resting upon it. A desk which is too high and is not properly placed not only tends to produce deformity of the spine, but also brings any book resting upon it too close to the eyes and produces near-sight-

edness as a result. Other affections of the eyes, followed by headache and other symptoms, result from the use of them in an insufficient light or from facing too bright a light. The windows should be at the back of the room and upon one side, preferably the left, since this does away with trying cross-lights. Of course, the same precaution regarding the proper arrangement of lights must be looked after when the child is reading at home.

As to the actual size of the school-room required, it is calculated that there should be 300 cubic feet of air-space for every scholar. For a class of forty scholars this will require a room 28 by 32 by 13½ feet (Lincoln). To render this amount of air-space sufficient to keep the room in a proper condition it is necessary that the air be completely changed *six times in an hour*. Manifestly an ordinary school-room with closed windows and no efficient system of ventilation does not accomplish this. No wonder the poor children grow sleepy and find study hard work!

CHAPTER XI.

THE SICK BABY.

THIS chapter, necessarily a somewhat long one, must not be viewed as an effort to render a mother capable of "doctoring" her own children. Such an attempt would be a hopeless one, inasmuch as with the treatment of a sick baby the experienced physician often has his hands far more than full. It is intended only to impart such knowledge as will enable a trained nurse or a mother—especially one living far away from medical advice—to know whether the child is ill, what is probably the nature

of its ailment, whether she shall send for a physician, what she shall do before he comes, and how she shall carry out his directions afterward. The actual treatment of disease, except of the simplest kind, cannot be considered here. It is far wiser for the mother to meddle very little with the baby's illnesses.

We may conveniently divide our subject into—

I. The Features of Disease ;
II. The Management of Sick Children ;
III. The Disorders of Childhood.

I. The Features of Disease.

We have already considered, in Chapter II., the characteristics of a healthy baby, often called "the *features of health.*" Keeping these clearly in mind, we can now deal with some of the "*features of disease,*" in order that we may see what can be learned by close observation of a sick child.

The *position* assumed in sickness is a matter of importance. A child feverish or in pain is usually very restless even when asleep. When awake it desires constantly to be taken up, put down again, or carried about. Sometimes, however, at the beginning of an acute disease it lies heavy and stupid for a long time. In prolonged illnesses and in severe acute disorders the great exhaustion is shown by the child lying upon its back, with its face turned toward the ceiling, in a condition of complete apathy. It may lie like a log, scarcely breathing for days before death takes place. Perfect immobility may also be seen in children who are entirely unconscious although not exhausted. A constant tossing off of the covers at night occurs early in rickets, but, of course, is seen in many healthy infants, especially if they are too warmly covered. A baby shows a desire to be propped up with pillows or to sit erect or to be carried in the

mother's arms with its head over her shoulder whenever breathing is much interfered with, as in diphtheria of the larynx and in affections of the heart and lungs. The constant assumption of one position or the keeping of one part of the body still may indicate paralysis. When, however, a cry attends a forcible change of position, it shows that the child was still because movement caused pain. Sleeping with the mouth open and the head thrown back often attends chronic enlargement of the tonsils and the presence of adenoid growths in young children, although it may be seen in other affections which make breathing difficult. In inflammation of the brain the head is often drawn far back and held stiffly so. Sometimes, too, in this disease the child lies upon one side with the back arched, the knees drawn up, and the arms crossed over the chest. A constant burying of the face in the pillow or in the mother's lap occurs in severe inflammation of the eyes.

The *gestures* are often indicative of disease. Babies frequently place the hands near the seat of pain : thus in slight inflammation of the mouth they tend to put the hand in the mouth ; in earache to move it to the ear ; and in headache to raise it to the head. In headache or in affections of the brain they sometimes pluck at the hair or the ears, although they may often do this when there is no such trouble. Picking at the nose or at the opening of the bowel is seen in irritation of the intestine from worms or oftener from other cause. The movements of the hands are, however, frequently misleading unless their apparent meaning is corroborated by other symptoms. For instance, a child with a painful disease of its chest may sometimes refer the discomfort to the abdomen and place its hands there. In approaching convulsions the thumbs are often drawn tightly into

the palms of the hands and the toes are stiffly bent or straightened. Very young babies, however, tend to do this, although healthy. The alternate doubling up and straightening of the body, with squirming movements, making of fists, kicking, and crying, is an indication of colic. This is especially true if the symptoms come on suddenly and disappear as suddenly, perhaps attended by the expulsion of gas from the bowel.

The *color of the skin* is often altered in disease. It is yellow in jaundice, and is bluish, especially over the face, in congenital heart disease. There is a purplish tint around the eyes and mouth, with a prominence of the veins of the face, in weakly children or in those with disordered digestion. A pale circle around the mouth accompanies nausea. The skin frequently acquires an earthy hue in chronic diarrhœa, and is pale in any condition in which the blood is impoverished, as in Bright's disease, rickets, consumption, or any exhausted state. Flushing of the face accompanies fever, but besides this there is often seen a flushing without fever in older children the subjects of chronic disorders of digestion. Sudden flushing or paling is sometimes seen in disease of the brain.

The *expression of the face* varies with the disease. Young, healthy babies have little expression of any kind except that of wondering surprise. In whooping-cough and measles the face is swollen and somewhat flushed, giving the child a heavy, stupid expression. There is also swelling of the face, especially about the eyes, in Bright's disease. Repeated momentary crossing of the eyes often indicates approaching convulsions. In very severe acute diarrhœa it is astonishing with what rapidity the face will become sunken and shrivelled, and so covered with deep lines that the baby is almost unrec-

ognizable. The same thing occurs more slowly in the condition commonly known as *marasmus*. Often the face has an expression of distress in the beginning of any serious disease. If the edges of the nostrils move in and out with breathing, we may suspect some difficulty of respiration such as attends pneumonia. The baby sleeps with its eyes half open in exhausted conditions or when suffering pain. Chewing movements during sleep result from disordered digestion, and a smile in very young infants often has the same cause.

The *head* exhibits certain noteworthy features. Excessive perspiration when sleeping is an early symptom of rickets. It must be remembered, however, that any debilitated child may perspire more or less when asleep, and that even healthy, full-blooded children are sometimes affected if the weather is very hot. Both in this disease and in hydrocephalus (water on the brain) the face seems small and the head large, but in the former the head is square and flat on top, while in the latter it is of a somewhat globular shape. The fontanelle is prominent and throbs forcibly in inflammation of the brain, is too large in rickets and hydrocephalus, bulges in the latter affec- and sometimes sinks in conditions with only slight The disfigurements of the head immediately fol- will be described later in this chapter (p. 299). exhibits a heaving movement with a drawing paces between the ribs in any disease in which is difficult. A chicken-breasted chest is seen disease of the spine, and to some extent in bad largement of the tonsillar tissue; a "violin- in rickets; a bulging of one side in pleu- and a long, narrow chest, with a general upper part, in older children predisposed

The *abdomen* is swollen and hard in colic. It is also much distended with gas in rickets, and is constantly so in chronic indigestion in later childhood. It is usually much sunken in inflammation of the brain or in severe exhausting diarrhœa or marasmus. It may be distended with liquid in some cases of dropsy.

The study of the *cry* furnishes one of the most valuable means of learning what ails a baby. An unremitting cry is usually due to hunger, or sometimes to thirst, but scarcely any cry is so unappeasable as that of earache. We must remember that not every cry that ceases when the baby is nursed is caused by hunger. Sometimes the cry of colic will be temporarily helped in this way. Sometimes a persistent cry is due to pain of another nature—such, for instance, as that caused by the pricking of a pin. It may also be produced by the intense, constant itching of eczema.

A paroxysmal cry, very severe for a time and then ceasing absolutely, is probably due to colic, particularly if accompanied by the distention of the abdomen and the movements of the body already referred to. If a child cries every time it is picked up, it is probable that the lifting gives pain. This may be the result of the grasping of the chest in rickets or pleurisy or the moving of the legs in scurvy. Crying when any one part is touched suggests, of course, that there is something wrong there. On the other hand, a cry which is often loud and persistent, but which ceases whenever the child is picked up or amused, is merely a bad habit on the part of the infant and shows lack of training. This kind of cry may be heard even early in infancy, and is sometimes very perplexing to the mother. A sleepy child has a fretful cry, often with rubbing of the eyes and other evidences of its sensations. A frequent, peevish, whining cry is heard in children with general

poor health or discomfort. A single shrill scream uttered now and then is often heard in inflammation of the brain. In any disease in which there is difficulty in getting enough air into the lungs, as in pneumonia, the cry is usually very short and the child cries but little, because it cannot hold its breath long enough for it. A nasal cry occurs with cold in the head. A short cry immediately after coughing indicates that the cough hurts the chest. Crying when the bowels are moved shows that there is pain at that time. A loud, violent cry coming on suddenly is very often an exhibition of temper. A child of from two to six years, waking at night with violent screaming, is probably suffering from night-terrors. In conditions of very great weakness and exhaustion the baby moans feebly, or it may twist its face into the position for crying, but emit no sound at all. This latter is also true in some cases of inflammation of the larynx, while in other cases the cry is hoarse or croupy. Crying when anything goes into the mouth makes one suspect some trouble there. If it occurs with swallowing, it is probable that the throat is inflamed.

With the act of crying there ought always to be tears in children over three or four months of age. If there are none, it is an indication that the disease is serious, and their reappearance is then a good sign.

The character of the *cough* is also instructive. A frequent, loud, nearly painless cough, at first tight and later loose, is heard in bronchitis. A short, tight, suppressed cough, which is followed by a grimace, and, perhaps, by a cry, indicates some inflammation about the chest, often pneumonia. There is a brazen, barking, "croupy" cough in spasmodic croup. In inflammation of the larynx, including true croup, the cough is hoarse or croupy or sometimes almost noiseless. The cough of whooping-

cough is so peculiar that it must be described separately when considering this disease. Then there are certain coughs which are purely nervous or dependent upon remote affections. Thus the so-called "stomach cough" is caused by some irritation of the stomach or bowels. It is not nearly so frequent as mothers suppose. Irritation about the nose or the canal of the ears sometimes induces a cough in a similar way. Enlarged tonsils or elongated palate or irritation in the throat may also produce a cough.

The *breathing* of a young child, particularly if under one year of age and awake, is always slightly irregular. If it becomes very decidedly so, we suspect disease, particularly of the brain. A combination of long pauses, lasting half a minute or a minute, with breathing which is at first very faint, gradually becomes more and more deep, and then slowly dies away entirely, goes by the name of "Cheyne-Stokes respiration" and is found in affections of the brain. It is one of the worst of symptoms except in infancy, and even then it is very serious.

The rate of respiration is increased in fever in proportion to the height of the temperature (see page 247). It is increased also by pain in rickets, and especially in some affections of the lungs. Sixty respirations a minute are not at all excessive for a child of two years with pneumonia, and the speed is frequently decidedly greater than this.

Breathing is often very slow in disease of the brain, particularly tubercular meningitis. Poisoning by opiates produces the same effect. Frequent deep sighing or yawning occurs in affections of the brain, in faintness, or in great exhaustion, and may be a very unfavorable symptom. Breathing entirely through the mouth shows that the nose is completely blocked, while snuffling

breathing is the result of a partial catarrhal obstruction. A gurgling in the throat not accompanied by cough may indicate that there is mucus in the back part of it, the result of an inflammation, sometimes slight, sometimes serious. "Labored" breathing, in which the chest is pulled up by each breath while the muscles of the neck become tense, the pit of the stomach and the spaces between the ribs sink in, and the edges of the nostrils move in and out, is seen in conditions where the natural ease of respiration is greatly interfered with, as in pneumonia, diphtheria of the larynx, asthma, and the like. Long-drawn, noisy inspirations and expirations are heard in obstruction of the larynx, as from laryngeal diphtheria or spasmodic croup.

The *rate of the pulse* is subject to such variations in infants that its examination is of less value than it would otherwise be. In early childhood its observation is of more service, although even then deceptive. Unusual irregularity is an important symptom in affections of the brain and of the heart. Fever is accompanied by an increase in the pulse-rate, the degree of which depends, as a rule, upon the height of the temperature (see p. 247). Slowing of the pulse is a very important symptom, seen particularly in affections of the brain, and sometimes in Bright's disease and jaundice.

The *temperature* and the method of determining it have already been referred to in Chapter II. It is of all things important to remember that in infancy and childhood fever is easily produced and runs high from slight causes. Although a very decided elevation should render a mother anxious to discover the cause, there is no reason why it should at once throw her into a paroxysm of fright (see p. 43). Even slight cold or the presence of constipation or slight disturbance of digestion may in babies sometimes

produce a temperature of 103° or more. We do not speak of fever unless the temperature reaches 100°. A temperature of 102° or 103° constitutes moderate fever, while that of 104° or 105° is high fever, and above 105° very high. A temperature of 107° is very dangerous, and is usually not recovered from. The danger from fever depends not only upon its height, but upon its duration also. A temperature of 105° may be easily borne for a short time, but it becomes alarming if much prolonged.

There is a notable tendency to variation of the temperature of fever during the day, the elevation at night being nearly always greater than in the morning. We do not need to be discouraged, therefore, should a child whose temperature had diminished considerably in the morning have it become much higher by the evening. On the other hand, should a morning fever be only as high as that of the evening before, we may conclude that the tendency to elevation is really greater. A sudden fall of temperature is usually a favorable sign, but this is not always so, for unless it is accompanied by an improvement in the other symptoms, it may indicate that death is imminent. The various febrile diseases have each their characteristic course with regard to the height, duration, and variation of temperature, but the subject is too difficult to be discussed in a book of this sort.

With elevation of temperature from any cause there is a corresponding increase of the rate of both pulse and respiration. In adults about eight or ten beats of the pulse and about two or three respirations may be added for each degree of temperature above normal. This ratio is equivalent to about one additional respiration for each three or four beats of the pulse. In children, however, the ratio is more valuable. There are certain diseases, also, as pneumonia, scarlet fever, typhoid fever, and some

others, where the rate of the pulse or of respiration is especially affected.

Instead of elevation we sometimes find depression of temperature below normal. A temperature of 97° or less in the rectum is sometimes alarming in children, and one of 95° rarely occurs unless the child is dying. One must be sure, however, that the record was taken correctly. Exhaustion from any cause, as from profuse diarrhœa, obstinate continued vomiting, or hemorrhage, is liable to produce a depression of temperature, and some degree of reduction is nearly always present in premature infants and in those suffering from insufficient nourishment, anæmia, or chronic diseases of the heart and lungs. So, too, during convalescence from the various febrile diseases the temperature is liable to be below normal for some days.

The *tongue* of new-born infants is generally whitish and continues to be so until the saliva becomes plentiful. After this we usually find it coated in disturbances of the stomach and bowels and in nearly any disorder accompanied by fever, although not, as a rule, so thickly as in adults. Yet we cannot lay so much stress on the coating of the tongue in the early years of life as in later years, for children with perfect digestion often exhibit coated tongues, while those with severe intestinal catarrh may often have tongues of perfectly natural appearance. In scarlet fever the tongue becomes bright red after a few days, and in measles and whooping-cough it is often faintly bluish. In the latter affection an ulcer may sometimes be found directly under the tongue, where the thin membrane binds it to the floor of the mouth. In thrush the tongue is covered with white patches like curdled milk. A pale, flabby tongue, marked by the teeth at its edges, indicates debility or impaired digestion. In prolonged or very high fever the tongue grows

dry, and in some diseases of the stomach or bowels it may look like raw beef.

Grinding of the teeth is a frequent symptom in infants in whom dentition has commenced. It generally indicates an irritated nervous system. Most often this depends upon some disturbance of digestion; less often upon the presence of worms. The symptom is present during or preceding a convulsion, and may occur, too, in disease of the brain. In some babies it appears to be only a nervous habit.

The *manner of nursing or swallowing* frequently affords important information. A baby whose nose is much obstructed or who has pneumonia can nurse for but a moment, and then has to let the nipple go in order to breathe more satisfactorily. If it gives a few sucks and then drops the nipple with a cry, we must suspect that the mouth is sore and that nursing is painful. If it swallows with a gurgling noise, often stops to cough, and does as little nursing as possible, we suspect that the throat may be sore. The ceasing to nurse at all, in the case of a very sick baby, is an evidence of great weakness or increasing stupor, and is a most unfavorable symptom.

Urine that is high-colored and stains the diaper, or that shows a thick reddish cloud after standing, may accompany fever or indigestion. Sometimes the urine under these conditions is milky when first passed. In some babies a diet containing beef-juice or other highly nitrogenous food will produce the reddish cloud, or even actual, red, sand-like particles. A decidedly yellow stain on the diaper occurs when there is jaundice. A faint reddish stain seldom indicates blood. The amount of urine passed is scanty in fever, in diarrhœa, and especially in acute Bright's disease. In the latter disease the urine is often of a smoky or even a muddy appearance. The possibility of the occurrence of this symptom after

scarlet fever must always be kept in mind, in order that a physician may be summoned very quickly, since it is a serious matter.

The *bowel-movements* characteristic of health have already been described. Apart from the various alterations in appearance seen in diarrhœa and constipation, and presently to be referred to, we find that the passages are often putty-colored in disorders of the liver, frequently bloody or tarry in appearance in bleeding within the bowel, and liable to be black after taking bismuth, charcoal, or iron, and red after krameria, kino, or hæmatoxylin. Infants who are receiving more milk than they can digest constantly have whitish lumps in their stools, or even entirely formed but almost white passages. The presence of a certain amount of greenish coloration of the passages is not infrequent. This is usually an evidence of indigestion, but passages which are yellow when passed and turn to a faint pea-green some time later are not an indication of disease.

II. The Management of Sick Children.

Where a good trained nurse used to the ways of children can be had, the nursing of a sick child will generally go on without trouble. Still, no mother ought to be without knowledge on the subject, and the majority need it badly in case they must themselves fill the nurse's place. The following remarks, although descriptive of the duties of a nurse, are intended especially for the mother nursing her own sick children.

One of the nurse's chief cares should be, of course, to observe the child closely in the search for evidences of disease. Another, and often a very difficult one, is the administration of medicine and food. If the child has been well trained in habits of obedience, it will take

what is given to it without much objection. If it is not so trained, the nurse must use whatever means of persuasion will most easily attain the desired end, or, failing in this, must exercise the greatest firmness and insist upon being obeyed. Very often the promise of a chocolate or other sweet, some pennies, or a simple toy will serve to overcome the obstinacy. This, of course, is rank bribery, and against all rules for moral training. Sickness, however, is hardly the time to inculcate principles which should have been taught long before, and the taking of food and medicine is so important that the end fully justifies the means. Should a child still prove obstinate, it is better to lose little time in argument or pleading which must be repeated several times a day. The nurse will do better if she promptly take the child up, wrap a shawl closely about its body and arms to prevent interference, hold its nose carefully, and then, when it opens its mouth to breathe, insert the spoon as far as possible, empty it gently, and withdraw it slowly. If the spoon is not withdrawn, the child has difficulty in swallowing. This seems like harsh treatment; still, if it is done without excitement or anger, and as a matter of course, the child soon looks upon it as inevitable, and will often take its medicine quietly, without making a frequent repetition of the procedure necessary. In young babies the pressure of the chin backward and downward with the finger will often serve to open the mouth. Often an infant who spits out the greater part of a teaspoonful of medicine will take it very well if given a little at a time.

Sometimes a child continues to fight so hard that the exhaustion following seems to overbalance all the good that can ensue. Let the physician be informed promptly of the state of the case, and let him have the responsibility of determining what course it is best to pursue.

In all giving of medicine there must be the strictest adherence to truth, and no child must ever be told that a disagreeable dose "tastes good." If this course is not followed the one dose is all that it will ever take. It will feel, too, that it has been imposed upon, and will distrust the nurse. The dose of medicine should always be made ready out of the child's sight. This does not give it time to think over the matter, and to determine to resist. In the case of children who lie stupid or semi-delirious in bed, and to whom the administration of medicine in the ordinary way is difficult or impossible, much can sometimes be accomplished by the use of the medicine-dropper. If this be inserted *beside* the teeth and emptied, the contents will usually be swallowed. The dropper should not be placed between the teeth, on account of the danger of its being bitten. Sometimes the child may be laid on its side and the medicine emptied from a spoon into the hollow of the cheek.

Many liquid medicines will be of a disagreeable taste no matter how great care the physician may take in prescribing or the druggist in preparing. The bad taste may be avoided to some extent by letting the child take a sip of milk or water, a mint drop, or a suck at an orange immediately before and after swallowing. It is to be remembered that nearly all medicines may be diluted with a little water, and that usually a little sugar may be added. This will make the task much less unpleasant. The physician generally intends the dose to be diluted in this way even though it may not be written on the label. Thus a baby may choke over soda-mint or a nitre mixture undiluted, but really likes it if water is added. Yet with some children the water added to a disagreeable medicine is a disadvantage, for it only makes the dose to be taken larger and the difficulty greater. Castor oil may be floated on soda-water, ice-water, whiskey and water, or

lemon-juice. In this way it often tastes very little. It is also nearly tasteless if stirred in hot milk, but the child must not be deceived as to the nature of the drink, or it may turn against plain milk. Cod-liver oil is not disagreeable to most children, many of them even learning to like it, especially if given in the form of an emulsion. All unmixed oils should be given from a spoon previously heated in hot water, in order to make them less thick. Bottles containing oily medicines should have the mouths always very clean, and be kept in a cool place to prevent the contents becoming rancid. Those containing syrupy medicines should also be cool to prevent fermentation and the blowing out of the cork. After taking any acid medicine it is a good plan for the child to rinse its mouth with a solution of baking-soda in water. This will prevent the teeth being set on edge or injured. Small and comparatively tasteless powders can best be placed directly upon the tongue and a sip of water then given to wash them down. Sometimes they may be mixed with a little sugar and taken in the same way. If larger, they can be stirred up thoroughly in a little jam or scraped apple, provided there is no disease of digestion which makes this inadvisable. Another good plan, where sugar is permitted, is to put a small quantity of this in a teaspoon, empty the powder upon it in an even layer, and fill up the spoon with sugar. The whole is then moistened with water and swallowed. Tasteless powders may frequently be given in bread and milk or milk toast without the child perceiving them in the slightest.

Very young children cannot take pills. Later they learn easily, particularly if the pills be placed within a little jelly or preserved fruit. It is sometimes a good plan to let the child practise with home-made bread pills until it learns how to swallow them easily. In giving liquid medicines it is important that all doses be meas-

ured accurately. Spoons vary greatly in size and, besides, we cannot determine just when they are exactly full. The little glasses marked with "teaspoon" and "tablespoon," to be had at any drug-store, are much to be preferred. As even these are not accurate, the best plan is to procure a one-ounce or two-ounce graduate, such as is used by druggists, marked with drachms and ounces (Fig. 99, p. 419). In the Appendix (113–115) will be found a table of equivalents showing the relative value of tablespoonfuls and teaspoonfuls, ounces and drachms, and so on, a table of dosage for different ages, and a dose-list of some of the medicines most frequently given to children. The proper doses of the various remedies which may be referred to under the different diseases will be found in this last table. The frequency of the dosing is not given, as this can be determined only by the physician. It must not be forgotten that the drops of all alcoholic fluids are much smaller than those of water (Appendix, 113).

Feeding a sick child is even more important than giving medicine, and often just as difficult. Where there is great loss of appetite it is important to remember that the child will sometimes drink all of a small glass of milk when it will take much less, or none, of a more formidable-looking larger one. A pinch of salt in boiled milk helps to take away its disagreeable taste—but it should be only a pinch. Under many conditions a little sugar may be added. Many children like the addition to the milk of a little cocoa or extract of vanilla. Sometimes a sick child can be persuaded to drink milk or to take other food if the nurse will take some also. Sometimes milk may be given in place of water when the child asks for a drink. When there is little desire for food every effort should be made to make the meal appetizing. As far as possible a child should not hear the matter of

his food discussed before him. Often it is better not to consult him in advance as to what he wants. In other cases some happy suggestion may awaken a desire for a certain article of food. In unconscious or delirious conditions food may be given from a medicine-dropper or a spoon in the way described for giving medicine under these circumstances (p. 252). Various other expedients dependent upon the individual case will suggest themselves to an intelligent, wide-awake nurse.

Three good rules are to be borne in mind in this connection: First, never make any experiment with new articles of food in the case of children suffering from diseases of the stomach or bowels or in typhoid fever; second, at the outset of any illness give little or no nourishment; third, if vomiting occurs whenever food is given in the course of any affection, stop all feeding until the doctor can be consulted. A number of prepared foods often useful in sickness will be found in the Appendix (Dietary).

An absurd and still too widespread idea is that a sick person must receive a limited amount of water. As a rule, and particularly in fevers, all the water that a child asks for may be given it, provided this does not take the place of nourishment. Often the promise of water as a reward will induce the taking of some food. Where for any reason the amount of water must be restricted, it will be found that a child will often be content with a small glass provided it is allowed to drain it, while it would have clamored for more if permitted to empty a large glass only partially.

Quiet in the room is very greatly to be desired, and is often wofully neglected. Babies cannot, and children of three or four years, or even older, do not, ask for it, since they do not realize that their headaches and nervousness are the result of noise. Visits by friends should be

forbidden. A sick child should be encouraged to lie in its bed as much as possible, although there are some exceptions to this. Thus, for instance, when a little patient has some disease attended by difficulty in breathing, it is usually much more comfortable if allowed to sit in its crib, or even if carried in the nurse's arms with its head over her shoulder. A weak, exhausted child, or one with fluid in the chest, should never be raised rapidly to a sitting position in the bed; indeed, all movement is to be avoided as far as possible, as it is exhausting and dangerous. A nurse about to move a child with an injured limb should always support the member well and keep it on the side away from her. A child with hip-joint disease or with disease of the spine should be lifted horizontally, in order to keep the weight of the body from pressing on the sensitive part. The position of the sick child in bed is of great importance in pneumonia or in any disease attended by exhaustion. It should be changed frequently from the back to one side or the other, to prevent the blood from settling in any one part of the lung and to hinder, too, the formation of bed-sores.

Many people seem to have an irresistible desire to cover children very warmly in bed, no matter how much fever they may have or how hot the weather may be. This is, of course, all wrong. The covers should be light in such conditions, and a child sufficiently old should be asked whether it is too warm. A feverish baby should never be held long on the lap in hot weather. On the other hand, whenever a child is taken up, though only for a moment, it should have a wrap thrown about it. We often forget, too, that when well enough to be propped in bed its arms and chest are often more lightly clothed than when it is completely dressed. It is folly to put a child to bed for a bronchitis and not to guard it,

by having it wear a light sack, against the danger of taking cold. There should be a bed-dress for the night and another for the day (see page 115).

Cleanliness of the body is very necessary in sickness. As a rule, the child should be sponged all over once or twice a day with soap and water or sometimes with water and alcohol, either cool or warm according to circumstances. In cases of diarrhœa careful local washing should follow each evacuation of the bowels. Starch-water (Appendix, 47) is preferable to ordinary water for this purpose, and the application of a dusting powder completes the drying. The warm tub-bath can be used in many diseases. In the eruptive fevers, however, neither this nor sponging should be employed without medical advice, since some physicians are much opposed to them in diseases accompanied by a rash. In eczema, too, the application of water sometimes does harm. It is much better at the beginning of any illness to obtain explicit directions regarding bathing.

Cleanliness of the mouth must be carefully attended to during sickness, especially if the mucous membrane is inflamed, since the decomposition which goes on may readily injure the teeth. The nurse must wash the mouth with an antiseptic solution (Appendix, 75) frequently during the day, or with a little magnesia mixed with water.

The bed for the sick child should be comfortable and clean. The sheets should be changed often, and the fresh ones always warmed before they are used. In cases of prolonged illness it is a good plan, although not often practised, to have two beds, one for the day and one for the night. This gives an opportunity for airing the beds, and the change is distinctly restful to the patient. A draw-sheet or pad of some sort is of service where there is any tendency to soiling of the bed.

After an offensive movement from the bowels fresh air is needed in the room as soon as possible. As the throwing open of the windows is often impracticable, an aromatic fumigating pastille or some coffee may be burned. This procedure, of course, does not purify the air in the slightest, but it does serve to conceal to some extent the disagreeable odor until ventilation can remove it entirely.

The method of nursing infectious diseases and of disinfecting the room has already been described when treating of the Trained Nurse and of the Sick-room in Chapters IX. and X.

Various methods for the external treatment of a sick child are often ordered by the physician. Baths are used for this purpose as well as for cleanliness. The baths may be general or local, hot or cold, applied in the form of sponge-baths, tub-baths, wet packs, and other methods, and medicated in various ways. Further details of these procedures and of their value in disease will be found under the heading of Baths in the Appendix (39–54).

Physicians often order dry heat or moist heat to be used locally. The former is applied in the shape of hot bottles, bags of hot water, sand, or salt, hot bricks, or a hot stove-lid. It is useful where the circulation is poor and the temperature of the body is lower than it should be. The hot articles should be wrapped carefully in flannel to prevent burning the skin. This is especially important when the child is unconscious and cannot complain, since serious burns have often been produced by carelessness in this respect. Moist heat is of value to relieve pain and inflammation. It may be used in the form of fomentations or of poultices of different kinds (Appendix, 54–66). The former are lighter, but the latter retain their heat longer.

Cold is applied locally, in the form either of cold compresses (Appendix, 54) or of ice-bags, in order to subdue inflammation or pain. Ice-bags are made of thin rubber, and are of different sizes and forms. The thinner the rubber the more easily does the bag adapt itself to the shape of the part and the more successfully keep it cool. Many of the ice-bags sold in the shops are entirely too thick and are practically useless. A pig's bladder filled with ice forms an excellent substitute for the rubber bag. The bag should be not more than half filled with small fragments of ice. If it is too full, it is impossible to apply it accurately. Since the moisture of the surrounding air condenses on the bag, dry towels must be so placed that the drip will not wet the child. A piece of thin cloth must sometimes be placed between the ice-bag and the skin to prevent the latter from being frozen, but ordinarily this is not needed, and checks the action of the cold too greatly. Young infants do not bear the application of cold in any form at all well.

The nurse will often be required to make other applications, such as mustard plasters, turpentine stupes, spice plasters, and the like (Appendix, 67–70). She will some-

FIG. 74.—Infant's syringe.

times need, too, to administer enemata for constipation or for inflammation of the bowel and diarrhœa, or perhaps even to give nourishment in this way. A hard-rubber syringe holding four to six ounces and fitted with a piston which moves very easily is well suited for ordinary use. Another form useful for small injections,

called the "Infant's syringe," consists of a soft-rubber bulb with a hard-rubber nozzle (Fig. 74).

In using a syringe the fluid should be drawn into it, the nozzle then well greased with vaseline and inserted, and the contents expelled very slowly. For giving large injections, as in inflammation of the bowel and constipation, the ordinary elastic bulb syringe (Fig. 75) or, much better, a fountain syringe (Fig. 4, p. 30) is sometimes to be preferred. A long rubber tube with a funnel at one

FIG. 75.—Elastic bulb syringe.

end and a hard-rubber nozzle at the other makes an excellent extemporaneous fountain syringe. As it is sometimes difficult to get a child to retain an injection, it is a good plan to wrap a narrow roller bandage firmly around the nozzle (Fig. 76). The pressure of the bandage against the opening of the bowel helps to prevent the fluid from being ejected. Large injections should be given very slowly, with the child upon its back or its left side.

It is sometimes necessary in cases of obstinate vomiting to wash out the stomach with a stomach-tube ("lavage"), or where food is refused, to give food through it ("gavage"). This procedure is neither as unpleasant nor as difficult as might be supposed. It requires, however, some special training to do it properly.

It is often necessary for the nurse to make applications to the throat. This is best done with a large, straight camel's-hair brush firmly fastened to a straight, stout

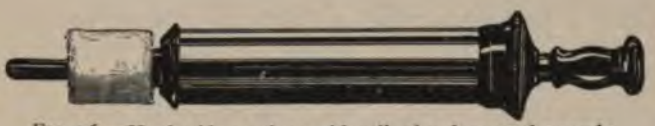


FIG. 76.—Hard-rubber syringe with roller bandage on the nozzle.

stick. The bent brushes or those mounted on wire handles are not nearly so easily controlled. Physicians often use cotton wrapped on a metal applicator. If the child is well trained and of sufficient age, it is simply necessary to depress the tongue with a spoon while making the application. In younger children the procedure is often one of a good deal of difficulty, and two persons are required to accomplish it satisfactorily. The helper holds the child facing a bright light, and wrapped in a shawl which keeps its arms and hands close to its sides. The nurse now takes her position opposite it, with a smooth-handled teaspoon in the left hand and a brush already prepared in the other. Watching her opportunity, she carefully inserts the handle of the spoon between the teeth and gradually and gently works it inward. As it reaches the back of the tongue the child gags and at the same time involuntarily opens its mouth widely. This is the moment for the rapid yet thorough painting of the throat.

Spraying of the throat is done with an atomizer (Fig. 77). When employing this apparatus it is important to see that the tongue is well depressed, as otherwise most of the solution lights upon it instead of where needed.

The method of observing pulse, temperature, and respiration has already been considered in Chapter II.

Something may be said here regarding the manner in

which the nurse should prepare the child for the doctor's examination. The clothes should be removed to a large extent. Certainly no starched garments should be left over the child's chest if an examination of this is to be made. It is impossible to hear anything accurately

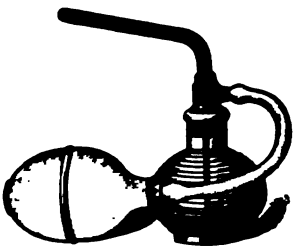


FIG. 77.—Bulb atomizer.

through these. Everything should be arranged in advance to facilitate a rapid, although gentle and easy and not hurried, undressing of the patient. Preferably the child should be in bed and dressed in its night-clothes only. A thin clean towel should be at hand which the physician may use to put over the chest, if he wishes it, after the night-clothes are loosened and slipped down or off. The nurse must see, too, that abundant light can enter the room, as any examination is unsatisfactory without this. If the physician wishes to examine the back, the child may be seated in bed or, if an infant, lifted over the nurse's shoulder. When it is very weak it may be rolled upon its stomach with the face turned to one side to give it full opportunity to breathe. When the throat is to be examined the nurse must see that there is abundant light from the nearest window. She should support the child in bed or in her lap, keeping its hands and feet well imprisoned, and letting the back of its head lean against her breast, on the side nearest to that on which the physician is standing. Holding it on the other side makes an examination very inconvenient.

A few words only can be devoted here to the diet to be followed in sickness. As has already been intimated it may be accepted as an axiom that every child suddenly taken ill is better, for some time at least, without food. This is particularly true of infants attacked by severe acute vomiting and diarrhœa. There is absolutely nothing to be gained by putting into a baby's stomach food which will simply serve to keep up the irritation present there or in the intestines. Certainly all milk should be stopped for twenty-four hours, and the baby be fed on barley-water (Appendix, 1) or albumen-water (Appendix, 3). Loss of appetite with a coated tongue occurring in a child of any age is not always a sign that a tonic or digestant is needed. It is often but a prayer on the part of the stomach to be given a period of rest. Should a feverish condition last some days, the diet should continue to be of the lightest. It is often one of the most difficult things imaginable to find out what kind of food will best agree with infants suffering from chronic indigestion or chronic diarrhœa. A sincere pity for the little patients compels me to urge most strongly that the mother make no experiments in such a case. Immeasurable harm to numberless babies has followed just such experimentation. The experienced physician, with his best endeavors, often finds the discovery of the proper food a herculean task. The various recipes for different articles of diet that will be found in the Appendix are intended, not to constitute a list from which the mother shall select at her own discretion, but to be a guide in the preparation of the food which the child's physician may direct. (See also Second Appendix, p. 425.)

A well-trained nurse keeps a careful daily record of everything which has taken place relative to the child. Thus a portion of such a record would perhaps read as follows:

JUNE 23, 1902.

8 A. M. Temperature, 102.6°; pulse, 140; respiration, 35. Took 6 ounces of milk and 2 ounces of lime-water. Cough medicine and pill given. A teaspoonful of whiskey.

10 A. M. Bowels opened, natural in appearance.

11 A. M. Took only 3 ounces of milk and 1 ounce of lime-water. Medicine and whiskey given. Temperature, 103°.

12.30 P. M. Very restless and nervous. Temperature, 105°. Has coughed a great deal. Sponged with cool water.

1 P. M. Temperature, 101.2°. Quiet; looks better.

2 P. M. Has slept for an hour. Temperature, 102°; pulse, 132; respiration, 34. Cough medicine and pill given. A teaspoonful of whiskey and 4 ounces of beef tea.

Such a record as this is of the greatest assistance to the doctor, and tells him of the progress of the case better than any answers to questions could possibly do.

A still better and more quickly-read arrangement, kept on paper of a suitable size, would be as follows:

Date.	Hour.	Temp.	Pulse.	Resp.	Medicines.	Food.	Stimulants.	Remarks.
6, 23 oz.	8 A.M.	102.6	140	35	1 teaspoonful cough mixture and 1 pill.	6 oz. milk and 2 oz. lime-water.	1 teaspoonful whiskey.	
	10							Bowels opened; natural in appearance.
	11	103			1 teaspoonful cough mixture.	3 oz. milk and 1 oz. lime-water.	1 teaspoonful whiskey.	
	12 30 P.M.	105						Very restless and nervous. Coughed a great deal. Sponged with cool water.
	1	101.2						Quiet; looks better.
	2	102	132	34	1 teaspoonful cough mixture and 1 pill.	4 oz. beef tea	1 teaspoonful whiskey.	Has slept for an hour.

As a rule, nurses keep the record of the pulse, temperature, and respiration on a special chart provided for

the purpose. There are various charts of this sort, of different patterns, to be had from medical publishers. The author ventures to recommend the "Graphic Clinical Chart" designed by himself.

III. The Disorders of Childhood.

Under this heading may be considered briefly a few of the commoner diseases, habits, and accidents of children, with such treatment as the mother is justified in using. They are classified to some extent as a matter of convenience, but the divisions are not sharply defined, and some disorders which have been placed in one class might with equal or greater propriety have been considered in some other. Lack of space has made the descriptions necessarily concise.

(1) Diseases of the Digestive Apparatus.

Hare-lip.—A complete cleft through one or both sides of the upper lip, exposing the teeth and even extending into the nose. It sometimes interferes with sucking, and makes it necessary to do forced feeding with a spoon or with the apparatus recommended for premature infants (p. 340). The time generally chosen for operation is in the early months of life. The success of the operation is often very remarkable.

Cleft Palate.—A fissure through the palate, forming one cavity of the mouth and nose. It is very often combined with hare-lip. It not only greatly interferes with talking later in life, but in infancy renders nursing impossible by taking away the power of suction. In such a case the infant must be fed with the mother's milk from a spoon or from a feeding-cup with a spout to it, to which a rather long and large nipple with large openings is

attached, or with the apparatus described for premature infants (p. 340). The milk thus flows into the mouth without the need of sucking. A special apparatus has been devised, consisting of an ordinary nipple to the upper surface of which is attached a flap of thin rubber, made to act as a false palate and to close the unnatural opening during nursing. Operation is generally deferred until the child is two or more years old.

Tongue-tie.—In this condition the little membrane on the under surface of the tongue is too tight or is attached too far forward and holds the tongue down. It is much more uncommon than is ordinarily supposed. If the child can suck well and can protrude its tongue at all, there is no tongue-tie of any account. The operation for the affection is simple and painless.

Inflammation of the Mouth.—A *catarrhal* inflammation may occur during fever, or from indigestion or lack of cleanliness. The mouth is hot and tender, and nursing is painful, the nipple being dropped with a cry. The lining of the gums, cheeks, and palate is much reddened, and is either dryer than natural or very moist from a profuse secretion of saliva.

In *aphthous* inflammation little shallow ulcers (*aphthæ*) form over the tongue, palate, and the lining of the lips and cheeks.

The treatment for either of these conditions consists in the administration of a mild purgative, such as castor oil or magnesia, and the frequent application of a mouth-wash (Appendix, 84).

There is a much more extensive and serious *ulcerous* inflammation, and another still worse, the *gangrenous* form, which must at once be referred to a physician; as, indeed, the simpler forms must be if they do not heal immediately.

Thrush.—A disease of the mouth far commonest in bottle-fed or sickly children in the early weeks of life. Small whitish patches, sometimes crowded thickly together, form over the lining of the mouth, and especially on the tongue, cheeks, and hard palate. They greatly resemble curdled milk, but differ in that they can be removed only by the use of considerable force. A lack of perfect cleanliness about the mouth and the bottles and rubber nipples, and the use of bottles with long rubber tubes, are active factors in producing the disease. It is very commonly associated with some disturbance of digestion, and it is distinctly contagious. The symptoms are an indisposition to nurse on account of the pain produced, often combined with colic and some diarrhœa and vomiting.

Treatment consists in the greatest cleanliness in everything about the food. The mouth should be washed very carefully every two or three hours with a solution of boric acid (Appendix, 79) applied on a soft cloth or on absorbent cotton, or the mouth painted with a little borax and glycerin (Appendix, 84). As the disease is sometimes fatal in delicate children, the advice of a physician should be obtained.

Disordered Dentition.—It has already been stated that the cutting of the teeth is not, as a rule, responsible for any of the ailments so commonly attributed to the process, and that redness of and irritation of the gums are not necessary parts of it. It is, however, true that some babies are peculiarly susceptible to even slight disturbances in the mouth, and that we occasionally find attending the eruption of the teeth various symptoms which apparently can be accounted for in no other way. At times a certain amount of catarrhal inflammation of the

gums is present, shown by increased heat with some redness and by a disposition to bite vigorously upon anything placed in the mouth.

Slight diarrhœa, loss of appetite, feverishness, bronchitis, some eruption of the skin, and, especially, great restlessness, irritability, or other nervous symptoms, may appear shortly before a tooth is cut, and disappear with astonishing rapidity as soon as it is through the gum. Remarkable improvement will sometimes follow within a few hours the lancing of the gum over an approaching tooth. Nevertheless, it is only rarely that lancing is really necessary. The important point is that disordered dentition is the great exception and not the rule, and that the mother must never assume that it is teething which makes her baby ill, and let it go as a matter unavoidable or of no consequence. Almost always it is something else than dentition which is producing the symptoms, and prompt, suitable treatment, or often even the use of an efficient mouth-wash (Appendix, 84) will quickly remove all the inflammation for which the teeth have been blamed.

If the baby enjoys biting on a soft-rubber ring or having its gums gently rubbed with the finger, there is no objection to this; but no attempt should ever be made to "rub the tooth through" with the finger-nail or a thimble or other hard substance, as this is often the cause of inflammation of the gums.

Dentition may be much delayed, or the teeth may come in irregularly or decay very rapidly. Early decay of the teeth or the completion of the first year without a tooth makes the existence of rickets seem very probable, although prolonged ill-health from other causes may act similarly. It occasionally happens that certain of the first or second teeth are never cut. Occasionally children are born with an incisor tooth already cut through.

Gum-boil.—This consists of an abscess at the root of a diseased tooth, lasting several days and then usually bursting. It often makes the face swell badly. Painting the gum with tincture of iodine or applying one of the little toothache plasters to be bought in the drug-stores may prevent the abscess from forming. Holding warm water in the mouth or the application of a warm-water bag to the cheek relieves the pain. Lancing the abscess is the quickest cure.

Sore Throat.—Infants with sore throat avoid much nursing and swallow with a gulp and a cry. Older children will frequently complain of the throat, but in many cases they make no complaint even though it is much inflamed. On this account the mother should herself, without fail, examine the throat in any commencing illness. Fever is generally present and the speech often is a little thick. The throat may be red without swelling of the tonsils, or the tonsils also may be red and swollen, and perhaps may exhibit one or more white points. It is needless at once to become greatly alarmed over these latter. They are common and usually mean nothing, but as they sometimes indicate beginning diphtheria, the child should be isolated at once and a physician be sent for. (See *Diphtheria.*)

A child with sore throat should be confined to bed, given a laxative, and allowed to suck pieces of ice frequently, and if old enough, to use an astringent gargle (Appendix, 86). If there is much fever, a simple fever mixture (Appendix, 108) may be administered until the physician arrives. He may find it best to give other remedies or to order the throat to be painted internally. The danger of permanent deafness following repeated attacks of sore throat must never be forgotten.

Chronic Enlargement of the Tonsils; Adenoid Growths.—This is a common affection in children, beginning in early infancy. The tonsils are pale without sign of inflammation, and sometimes are so large that they almost touch. Associated with this enlargement is usually an overgrowth of certain tissue resembling the tonsils (adenoids), situated out of sight high up in the throat at the back of the nose, and it is this overgrowth that causes the chief hinderance to breathing. In some cases the child constantly breathes with its mouth open, and often snores badly at night. Its speech is thick, affections of the ears are frequent, and the voice has a heavy, stopped-up sound, much like that of a person with a bad cold in the head. Treatment is important, since the constant difficulty in getting sufficient air is liable to occasion bronchitis, sore throat and heavy breath, to produce impairment of development and of the general health, and even to make the child chicken-breasted. Permanent deafness may also result.

Chronic Indigestion.—A condition marked by capriciousness of or great loss of appetite, coated and often "worm-eaten" tongue, flushing of the face with or without fever, pain and swelling of the abdomen, restlessness at night, slight headache, and often constipation alternating with slight diarrhœa. Mucus is very apt to appear in the passages, whether these are loose or hard. The disease is frequently seen in childhood and is a very obstinate one. In the line of treatment diet is of prime importance. All fats and sweets must be avoided, and the amount of starchy food be reduced very much. Milk, lean meats, poultry, eggs, and green vegetables constitute the principal articles of diet. Medicines are usually required.

Vomiting.—The fact that an over-fed baby will regurgitate the excess of milk which it has taken has already been alluded to (p. 120). There is a difference between regurgitation and true vomiting. The latter is accompanied by coldness, pallor, and moisture of the skin, indicating nausea. The vomiting may be a single effort and may bring relief, or it may be repeated again and again until the patient's state is alarming. It does not always indicate a disordered stomach, for it frequently ushers in some acute disease, such as pneumonia or scarlet fever, and it is repeated and very obstinate in inflammation of the brain. The importance is manifest of having a physician determine the cause in serious cases. The first treatment consists in the immediate and absolute stopping of all nourishment. No food should be given for six or more hours, and after that only small amounts of barley-water or albumen-water (Appendix, 2, 3). Complete rest is essential, and trotting on the knee, raising suddenly, or other quick movements must be avoided. A spice plaster or mustard plaster (Appendix, 68, 69) may be placed over the position of the stomach, just below the ribs in front, slightly to the left side. Soda-mint (Appendix, 105) may be given, or to older children soda-mint and tincture of ginger. The swallowing of pieces of ice (not allowing them to dissolve in the mouth) is often useful. After the attack is over a laxative, such as magnesia, may be administered, for the purpose of carrying out of the intestines any irritating substances which may have entered them.

Diarrhœal Diseases.—These are oftenest caused by improper food, by taking cold, or by very hot weather. They are exceedingly common in bottle-fed babies in summer-time, as a result of changes produced in the

milk by the germs, the growth of which the high temperature so greatly favors. The number of passages varies from four or six up to thirty, forty, or more in twenty-four hours. Their character, too, is changed from the normal. They may be greenish, yellowish-green, whitish from the presence of undigested milk, clay-colored from absence of bile, black, brown, or colorless; semi-liquid or very watery; odorless or excessively offensive; small in size or so large that we wonder how a child's bowel could have held so much. Mucus and blood may be present.

In *simple diarrhœa*, which is very common in summer, the passages exhibit some one of the colors mentioned, there is little if any fever after the first day, and vomiting may or may not occur.

In *cholera infantum* the passages are very numerous, are entirely watery and colorless, and there is constant, exhausting vomiting and high fever, followed at last by great coldness. It is a comparatively rare disease.

In *inflammation of the intestine* (inflammatory diarrhœa; dysentery), on the other hand, the movements are usually small, frequent, liquid, exhibit color of some sort, and contain mucus and often streaks of blood. Sometimes the movement is almost entirely of blood-stained mucus. Moderate fever is present, and vomiting is not a prominent symptom. More or less straining usually occurs. Many of the cases of severe summer diarrhœa are of this nature.

An infant "falls away" with astonishing rapidity in severe diarrhœal disorders, and in twenty-four to forty-eight hours may become shrivelled, wrinkled, and cold. The disease is, as a rule, not so rapid or so serious after infancy is past, but even then it is very weakening; consequently no case should ever be allowed to run on

without treatment. A mother, if she cannot possibly do otherwise, may treat slight attacks herself for not longer than twenty-four hours, but after this must delay no longer in calling in a physician. She should be careful to save the passages to show to him.

The first essential of treatment is to stop all food, since it only adds fuel to the fire. A baby if hungry may have a little barley-water (Appendix, 1). If very hot it may be bathed with cool water, or if cold may have a mustard bath. Absolute rest in bed is very desirable. In the beginning of the attack a dose of castor oil may be given to empty the bowel of anything irritating it. After this has acted 1 or 2 teaspoonfuls of a chalk-and-bismuth mixture (Appendix, 107) may be given every two hours. Bismuth makes the passages black, and no alarm need be felt at the presence of this color. The mother should never give paregoric, laudanum, or other preparation of opium to a child suffering from diarrhœa or any other disease. It is an invaluable but a dangerous medicine.

Some healthy-looking but over-fed babies, instead of regurgitating, constantly void undigested milk in the stools and have too frequent passages. The amount of food should be reduced or its character altered. Insufficient clothing is a cause of repeated attacks of diarrhœa. A careful covering of the abdomen, arms, and legs with close-fitting garments of a nature suitable to the season is the best prevention in such cases.

Constipation.—A very frequent disease in children, and especially in infants. Those fed on the bottle are most disposed to it. The passages may be too infrequent or too hard, and generally are both. In treating the affection the cause of the difficulty should be sought and removed, and laxative drugs be used as a last resource.

[redacted]

[illegible] is often needed, [illegible] can sometimes be added [illegible] artificially fed babies. A [illegible] once a day, or [illegible] two or three times a day, is [illegible]. The [illegible] of oat- [illegible] in pre- [illegible] malt [illegible] laxative [illegible] of [illegible] be added [illegible] the [illegible] In [illegible] [illegible] [illegible]

pressure just above the right groin, and be carried in a horseshoe-shaped curve up to the edge of the ribs, across to the left side, and down toward the left groin, thus following the course of the large intestine and propelling its contents toward the opening. The hand should be warm, a little sweet oil or vaseline should be used, and the massage should last about ten minutes.

The treatment detailed is intended for habitual constipation. For the immediate unloading of the bowel one of the simplest and least harmful methods is the giving of an enema of warm water containing salt in the proportion of a teaspoonful to a pint. Soapy water may be used instead if something stronger is needed. The amount to be injected varies with the age. For young babies four to eight ounces are sufficient, and for those of two years three or four times this amount. Either the infant's, the hard-rubber, or the fountain syringe may be used, according to the amount of fluid to be given. A useful injection consists of half a teaspoonful of glycerin with four or five times as much water, or, if this does not answer, of glycerin in full strength. This is best given from a small hard-rubber syringe holding not more than an ounce. The opening in the nozzle should be larger than ordinary, as the glycerin does not flow readily. If the mass in the bowel is large and very hard, an injection of half an ounce of warm sweet oil, retained some hours if possible, is better than anything else. It should be followed by an enema of soapy water. In some cases it is necessary to insert the finger or a small smooth spoon-handle into the bowel and break up the masses carefully.

Glycerin suppositories (glycerin and soap) of a size for children are often excellent for emptying the bowel, but are sometimes irritating. Gluten suppositories are milder and are serviceable in many instances. A more economical plan is to employ little home-made supposi-

tories of Castile soap or, in place of these, a soap stick, which also can be made at home and which has the advantage of lasting for repeated usings. It consists of a smooth, conical stick of firm Castile soap two or more inches long, half an inch thick at the base, and tapering toward the other end to the thinness of about one-quarter of an inch (Fig. 78). It should be dipped in vaseline or water before using, inserted part way into the bowel, and held there until a tendency to an evacuation shows itself.

FIG. 78.—Soap stick.

If none of the methods described are effectual, laxative drugs must be employed. Their use, however, ought to be deferred as long as possible, and is much better prescribed by a physician. One of the best and least harmful of drugs is cascara in some form. There are some preparations of cascara which have a pleasant taste and are fairly effectual. Another very useful preparation is the syrup of senna, which is easily taken by children, as its taste is agreeable. Little sugar-coated pills, each containing $\frac{1}{10}$ grain or less of aloin, are sometimes of service, one being given daily to a child of two years. A small quantity of manna, about 5 grains, can be given to a baby of six months once a day or oftener, dissolved in the milk, as its taste is sweet, or 10 grains of phosphate of soda may be used in a similar manner. Magnesia or spiced syrup of rhubarb answers very well, but only for occasional use.

Colic.—Severe pain in the abdomen, usually due to distention by gas. It is one of the commonest ailments ...nfancy, and frequently appears in those perfectly well ...her respects. It may occur either only occasionally ...any times every day. The symptoms consist of

sudden and violent crying—which may continue until the child is bluish in the face and often exhausted and cold—a swollen and hard abdomen, and alternate doubling up and straightening of the legs, arms, and trunk. These symptoms last a variable time and then suddenly cease, perhaps preceded by the passage of wind by the mouth or bowel. Chilling of the skin and indigestion are the commonest causes, the latter depending on unsuitable food, or too frequent or too abundant feeding. To prevent repeated attacks the stomach should be allowed to rest by diminishing the amount of nourishment and increasing the length of time between feedings. If the baby is bottle-fed, it may be necessary to change the character of the food in some way, but this should be the duty of the physician. The child must be warmly clothed, since any chilling of the surface may cause pain, no matter how good the digestion may be. The feet and legs especially should be kept warm by thick loose socks and by daily friction with a mixture of 1 part of turpentine and 3 parts of sweet oil. An abdominal binder may be worn if one is not already in use.

During an attack the baby must never be fed. The warm milk, it is true, often stops the crying for the moment, but it is sure to increase the indigestion and to bring the pain back as bad as, or worse than, ever. Rubbing the abdomen for several minutes, or the mere change of the child's position, as by lifting it over the shoulder, will sometimes cause the gas to escape and the colic to cease. A spice plaster (Appendix, 68) is often very useful. A small hot water bag may be used if the infant is sufficiently quiet. Thorough opening of the bowels by an enema (p. 275), as for constipation, is often very efficacious. Generally, some medicine given internally is necessary. Peppermint-water or cinnamon-water, diluted and given after each nursing, may keep the pain from

coming on; while during an attack one of the simplest and most effectual remedies is soda-mint (Appendix, 105) mixed with an equal quantity of hot water and given every half hour or hour for a time. If the baby seems exhausted and cold as a result of the pain, it should be given a few drops of brandy in a teaspoonful of hot sweetened water and be placed at once in a hot bath, and after that should be kept very warm and have a mustard plaster (Appendix, 69) applied over the abdomen. The doctor should be summoned at once. Constantly-recurring colic, not relieved or prevented by the means described, is beyond the ability of the mother to treat.

Congenital Closure of the Bowel.—Complete obstruction, oftenest not far within the opening of the bowel, or the entire absence of any opening. Failure on the part of the baby to empty its bowels for one or two days after birth renders one suspicious of the presence of this condition. Unless some operation is performed, death is inevitable in the course of a few days.

Prolapse of the Bowel.—A protrusion of more or less of the bowel through the external opening. It is usually the result of diarrhœa or of the straining of constipation, and generally occurs in debilitated children. In the mildest and fortunately the most frequent cases only the lining of the bowel is pushed out for about half an inch, forming a dark, purplish-red, puckered ring outside of the opening. This can be easily pushed back, or it goes back of itself after a little time. The protrusion may take place every time the bowels are opened with the slightest straining effort. In the more serious cases a protrusion of five or six or more inches of intestine may take place at any movement of the bowels, or

even when the child is walking or standing. The prolapsed bowel gives at first discomfort, and soon actual pain if not replaced. After the protrusion has occurred a few times it is apt to happen repeatedly.

The first treatment is to replace the prolapse. The child should be laid upon its back or stomach and the protruding bowel be gently pushed back with the fingers, previously well greased with vaseline. To prevent the recurrence the passages must be kept soft and all straining be avoided. Cold bathing of the parts is useful. While the bowels are being moved some support must be given by pressing the buttocks together or by placing the child upon its back and receiving the passages in a diaper. A board with a small hole in it three or four inches in diameter, placed over the chamber, gives great support and tends to prevent prolapse. In cases which do not readily yield to this treatment astringent injections or suppositories will be prescribed by the physician in charge. Very bad cases need operation.

Rupture; Hernia.—A protrusion of a portion of the bowel through some weak spot in the muscles of the abdominal walls, forming under the skin a soft, round swelling which grows larger when the child cries, often disappears when it lies down, and can easily be pushed back into the abdomen. It is a common affection in infants, may even be present at birth, and is most often seen at the navel, and next in the groin. Hernia is always dangerous if neglected, and should be treated at once. The physician in charge will probably prescribe a support of some kind, perhaps a truss, which must be worn the entire time. If for any reason this is taken off for a moment, the bowel must be kept in by the hand. Recovery nearly always follows if treatment

is begun early. Should a baby with rupture begin to cry persistently, to suffer from constipation and obstinate vomiting, and to appear very ill, a physician must be called immediately, for it is possible that the bowel has been constricted at the opening through the tissues and has become inflamed, and the condition is then very serious.

Worms.—There are three principal species of worms which may be found in children: (1) the thread-worm; (2) the round worm; (3) the tape-worm. The first and second varieties are much the commonest.

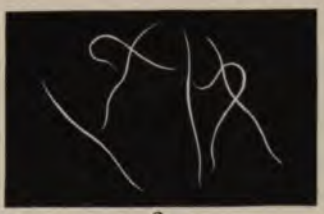
Worms produce only indefinite symptoms or none at all. They may, it is true, cause itching at the opening of the bowel, picking at the nose, variable appetite and other evidences of disordered digestion, restlessness at night, grinding the teeth, and perhaps even convulsions, but many other disturbances of the digestive canal can produce these symptoms equally well. The great majority of the children who are supposed by their mothers to have worms are suffering from something else.

(1) *Thread-worms* or *seat-worms* strongly resemble little pieces of white cotton thread from ¼ to ½ inch long (Pl. II., Fig. 2). They occupy the lower part of the bowel, and coat the passages in great numbers. This species is the one particularly liable to cause at night severe itching of the opening of the bowel. Treatment consists in great cleanliness and the injection every other night for a week or two of as much of an infusion of quassia (Appendix, 83) as the child can hold comfortably. If this does not answer, medical advice will be needed.

(2) *Round worms* are reddish-white in color and resemble common earth-worms in shape, but are thicker and from four to twelve inches long (Pl. II., Fig. 1). They

PLATE II.

1



2

3

1. Round worm. (Drawn from life; one-half natural size.) 2. Thread-worms. (Natural size.) 3. Small portions from different parts in the length of a tape-worm. (Drawn from life; *natural size.)*

inhabit the small intestine, but often wander into the large intestine and are evacuated, and sometimes even enter the stomach and are vomited. They may be present in the bowels in great numbers. Although evidences of indigestion may be present, the only characteristic symptom is the discovery of the worm in the passages. No "worm medicines" should ever be given except by the family physician, for they are not safe in the hands of others.

(3) *Tape-worm* is occasionally seen in children. Often not even the ordinary evidences of digestive disturbance are produced by it, and the only way of recognizing that there is a worm is the discovery of portions of it in the passages (Pl. II., Fig. 3). The parasite is composed of a great number of segments joined together, making a total length of perhaps many feet. The segments are smaller and smaller as they approach the "neck" and the "head." The neck is no thicker than a thread, and the head is only about as large as an ordinary pin-head. The treatment of the disease is beyond the skill of the mother. It is essential to remove the head in order to prevent a new worm from forming. To be sure that this has been accomplished the bowels should be opened into a vessel of water and the passage then be shaken about gently and without pulling the worm until the feces are entirely separated. The water may then be poured off carefully and fresh added until quite clear, when the worm may be examined. The worm should never be pulled upon while it is being passed, lest the head be broken off in the bowel.

Jaundice.—A very common affection in early life, characterized by yellowness of the skin, the lining of the mouth, and often of the whites of the eyes, and by highly

colored urine which stains the diapers yellow. It is particularly frequent in the first week of life and is then but slightly developed, the eyes and often the urine not being discolored. In such cases the condition may almost be called physiological. No other symptoms are present. In more severe cases, either at this age or later, some disease of the digestive apparatus, or occasionally some serious constitutional disturbance or malformation, is usually the cause. The jaundice is more intense and prolonged, the eyes and urine are discolored, and the passages from the bowel are often clay colored, and there are symptoms showing that the child is not well in other respects. No treatment is required for the mildest form described occurring in the first few days of life. In severe cases any treatment needed must be left to the physician in charge. Older children may have a light diet, as of beef-tea or milk foods, and be given magnesia or some laxative mineral water. Further treatment is generally required, as the discoloration is liable to be very persistent at times.

(2) DISEASES OF THE ORGANS OF RESPIRATION.

Cold in the Head; Coryza.—A disorder to which children are particularly liable on account of the greater sensitiveness of their skin. To avoid it draughts must be carefully shunned, particularly upon the nearly bald head of a baby, clothing must be sufficiently warm, yet not too warm, and the general health must be made robust by an outdoor life and the avoidance of overheated and ill-ventilated rooms. It is probable that micro-organisms also play an important part in the production of colds, since the disease often attacks several members of a family or even becomes epidemic. It is also certain that the presence of adenoid growths in the

nose, or of some other chronic derangement, greatly predisposes to repeated attacks.

The symptoms of coryza consist in watering eyes, sneezing, running nose, and a nasal tone of the voice. Some degree of fever is often present. The disease is troublesome in infancy, for the obstruction to the breathing renders sucking difficult. One of the great dangers dependent on coryza is inflammation of the ears, or, in case colds are of frequent occurrence, permanent deafness.

Treatment consists in giving the child a warm bath or a mustard foot-bath in a warm room, drying it carefully and rapidly, and keeping it in a temperature which is very equable and rather higher than usual. It is better, indeed, to put the child to bed. The diet should be lighter than usual. A laxative, preferably castor oil, should be given, and a fever mixture (Appendix, 108) if needed. It is often useful to apply vaseline within the nose with a camel's-hair pencil, and also to rub it upon the bridge. A fine spray of liquid vaseline may also be used in the nose (p. 261), but this is best ordered by the physician.

Spasmodic Croup.—This disease, although very alarming, is fortunately not often dangerous. It is generally the result of exposure to cold, but is sometimes due to indigestion or to irritation of the throat. Some children are very liable to suffer from repeated attacks, while others never do, however severely they may take cold. Often there is an evident family predisposition. The symptoms may or may not begin with hoarseness during the day, and toward night the peculiar sharp, barking, metallic, "croupy" cough. After the child has been asleep for a few hours it awakes suddenly, sits upright and grasps at any-

thing it can reach, and is scarcely able to get its breath. The croupy cough is now loud and very characteristic, the respiration labored, the inspiration of air noisy, the voice hoarse, and the face perspiring and of a bluish tint. The worst of the condition lasts only a short time, but a tendency to croupy cough and oppressed breathing may persist for some hours, after which the child drops asleep, and usually rests quietly for the remainder of the night. Another attack is very apt to occur upon each of several succeeding nights.

The disease is commonest in the third year of life, and then as a rule steadily decreases in frequency. It is seen only occasionally after the age of six years. In some cases an unusual degree of catarrhal laryngitis accompanies the spasmodic contraction of the larynx. In these the croupiness does not appear so quickly at night, and tends to persist more or less during the day as well. These cases suggest diphthêria strongly and must be studied very carefully.

Treatment is primarily preventive. Croupy children should be guarded with especial care against exposure to wind and dampness. On the slightest sign of croupiness in the afternoon the mother should administer some medi-ne prescribed by the physician; or, in case she has no h preparation, she can use that given in the Appendix). This is not one of the strongest, but is one which can safely give without medical advice.

the treatment of the attack a warm mustard bath an emetic (Appendix, 111) should be given, the latter ng repeated in twenty minutes if it has had no effect. ening the air with the steam atomizer or the croup (p. 232) is of great service. There is absolutely no in amber necklaces and such other relics of bar- superstition, except the sedative action upon the

mind of the mother. Instances of apparent cure by them are merely coincidences.

Membranous Croup.—See *Diphtheria.*

Bronchitis.—An inflammation of the bronchial tubes accompanied by cough. It is a very common affection in children. The causes are the same as those of coryza (p. 282), and an attack of this usually precedes the bronchitis. Any hoarseness present is due to laryngitis. The cough is frequent, at first dry and tight, but later becomes loose and rattling as the inflammation diminishes. Often some wheezing or rattling can be heard with respiration. The child does not seem very sick unless the bronchitis is unusually severe; has but slight fever, and breathes but little, if any, more rapidly than natural. It may cough up a good deal of mucus, but, before the age of six or seven years, nearly always swallows this instead of spitting it out. The only treatment the mother may venture on is the general method advised for cold in the head, combined with a thorough rubbing of the chest, both in front and behind, twice a day with oil of amber, diluted with equal parts of sweet oil if the patient is less than a year old. A physician should be called in at once, as in infancy and early childhood the disease may easily pass into pneumonia.

Pneumonia.—The terms *congestion of the lungs*, *pneumonia*, *capillary bronchitis*, and *inflammation of the lungs* are to all intents and purposes identical in meaning. The disease may come on suddenly, perhaps even with a convulsion and without previous warning, or it may develop from a bronchitis already present. There are high fever, flushed cheeks, a frequent, painful, and very short

cough, and rapid catching breathing, with a moving in and out of the edges of the nose, and, in bad cases, of the pit of the stomach and the spaces between the ribs, and a tugging of the muscles of the neck. The child is restless and tossing, or, if very sick, sometimes lies quiet with its cheeks and lips pale and bluish and its breathing very rapid and shallow.

The disease is always serious, and requires the combined skill and attention of the physician, nurse, and mother. In addition to what was said in the general remarks on disease and on nursing earlier in this chapter, it may be stated here, first, that the labored breathing shows the need of plenty of fresh air, although without draughts; second, that the child may be allowed to assume any position it pleases, and that a change of position may give great relief; third, that in any case where blueness, pallor, and failure of the powers are coming on rapidly, a hot bath may be administered while the doctor is being sent for, and may save the baby's life (see p. 398).

(3) DISEASES OF THE BRAIN AND NERVOUS SYSTEM AND OF THE SPECIAL SENSES.

Convulsions, Spasms.—One of the most common and dangerous diseases of infancy and early childhood, demanding knowledge, presence of mind, and decision on the part of the mother. Among the various causes are the onset of some severe illness—such as pneumonia or scarlet fever,—indigestion, constipation, intestinal worms, high fever from whatever source, disordered dentition, diseases of the brain, very hot weather, fright, severe pain, rickets, whooping-cough, etc. The frequency of convulsions is much the greatest in infancy, and rapidly diminishes after the first year. In the milder attacks, often called "inward spasms," there may be only a

tendency to squint and to bend the thumbs into the palms, with slight twitching of the mouth or eyelids, and perhaps of the head or limbs. These symptoms may pass away in a moment, may last unchanged for hours, or may usher in a fully developed attack.

In a typically severe convulsion the child often makes a choking sound, ceases to breathe for a moment, and becomes unconscious, stiff, and somewhat arched backward. The eyes are staring, rolling, or squinted, the hands clenched, and the mouth firmly shut. In a few seconds the face becomes bluish from lack of air in the lungs, and then the "working" begins. In this stage the breathing is irregular and noisy; the arms, legs, and trunk are jerked about in all directions, but principally with alternate bending and straightening movements; the eyes are rolled; there is frothing at the mouth, and the teeth, if there are any, are ground together and may bite the tongue. In a few moments the movements grow less violent and then cease, and the child begins to cry or goes into a heavy sleep with its body rather stiffer than usual. Sometimes before consciousness is regained or the rigidity has disappeared, another spasm occurs, and so the child may go on from fit to fit until it dies. The whole attack lasts from one or two minutes to hours.

Treatment must be very prompt. The child should at once have a bath of 100° F. which should cover it to its neck, while cold cloths, frequently renewed, are kept on its head. It must be left in the water for ten minutes, and then be wrapped in a blanket without drying. Since the attack may be due to irritating food in the stomach, the child should be made to vomit by giving it a teaspoonful of syrup of ipecacuanha or other emetic (Appendix, 111) just as soon as it can be made to

swallow. If the fit still continues and the doctor has not come, the bowel should be washed out with a large injection of warm water, and this be followed by one suitable to quiet the nervous system (Appendix, 87), the latter injection being held in by pressure of the thumb over the opening of the bowel. Fortunately, the hot bath and the emetic answer every purpose in most cases, and relieve the attack in a few minutes, sparing the mother the responsibility of using the injection, which is one of decided power.

In very severe cases which have resisted other treatment and where no physician can be obtained, the child may be made to inhale a small quantity of ether poured upon a towel and held close to the nose. This should be kept up only until relaxation of the body and cessation of the convulsive movements occur. It must be borne in mind that ether in unskilled hands is dangerous. It should be used only as a last resort, and because not to use it is the greater evil.

The *convulsions of epilepsy* are identical in appearance with the ordinary spasms described. They may begin in early infancy, and in such cases can be distinguished only by the persistent recurrence of the fits as the child grows older. No special treatment is needed during the epileptic convulsion, other than placing the child in a comfortable position, guarding it from injuring itself and loosening the clothing about the neck. No effort should be made to straighten the arms, bend out the thumbs, hold down the legs, and the like.

Night-terrors.—In this disease a child of from two to six years or older, apparently in perfect health, starts suddenly from sleep, screaming and cold with fright, stands in bed or even runs through the room, does not

seem thoroughly conscious, fails to recognize its mother, and cannot be pacified. Night-terrors differ from an ordinary nightmare in the confusion and fright which persist after waking, and in the child's inability to tell afterward what frightened it. As a rule, the attacks, of which there is usually but one in the course of the night, come on after one or two hours' sleep, and last but a few minutes. They may occur every night or only at irregular intervals, and in rare cases they take place even while the child is awake during the day. The principal causes are probably some disturbance of digestion and the existence of a highly sensitive nervous system. Treatment consists in careful diet if there is indigestion, a healthy outdoor life, the avoidance of excitement, and especially the giving of a very light evening meal. If this does not cure and the attacks are frequent, medical advice should be obtained.

Sleeplessness; Insomnia.—This arises from a great many different sources, and the treatment, of course, varies accordingly. Among the causes may be mentioned colic or pain of any other nature; constipation; indigestion; too much sleep during the day; too early going to bed; too exciting play just before bedtime; hunger resulting from too long an interval between nursing and putting to rest; too hearty a supper in the case of older children; not enough fresh air during the day; imperfect ventilation and over-heating of the bed-room; hot bed-covering at night; cold feet; a bright light in the room, and the sound of voices penetrating into it. The remedies for these causes are self-evident. A baby nursed too frequently during the day may show the force of habit by desiring to be fed often during the night,

although not actually hungry. When a baby begins to fret as though sleepy, and yet will not sleep, it is fair to presume that it has been over-fatigued. It is "too tired to sleep." Prevention is the only cure for this. In many cases, especially in nervous subjects, there seems to be no cause whatever for insomnia except an individual peculiarity, and the child may lie in bed entirely comfortable, yet equally wakeful. In such cases it is often a good plan to give the daily bath at bedtime, making it slightly warmer than usual, in order to obtain its sedative action, and simply to sponge in the morning. Sometimes putting the child to bed at a rather later hour is of service.

There is a large selection among drugs useful in sleeplessness, and some of them are decidedly harmful under certain conditions. The one to be chosen requires very careful consideration, and the mother should never give any of them except by medical advice.

Headache.—Pain in the head is of frequent occurrence in children, and even in babies. Older children complain directly of it, but in infants it can be recognized only by a wrinkling of the brows, persistent crying, a rolling of the head from side to side, or the moving of the hand toward the painful region. The causes of headache are very numerous, and often difficult to ascertain. Among the most common of them are forms of brain disease, and especially meningitis, fever from any cause, neuralgia, indigestion and constipation, fatigue, impoverishment of the blood, strain of the eyes at school, confinement in badly ventilated rooms, lack of outdoor exercise, excessive mental work, general debility, and disease of the heart or kidneys. To distinguish which is the acting cause, and then to determine what treatment

is required, are usually beyond a mother's power. Rest, the prevention of noises, bathing the head with cold water or bay rum, a mustard plaster at the back of the neck, a mustard foot-bath, restricted diet, and the administration of a laxative may be tried without danger.

St. Vitus's Dance; Chorea. — A nervous disorder chiefly seen in children, characterized by irregular jerking movements of the arms and legs, often with grimaces and sometimes with decided loss of power. The attack frequently begins with what appears to be awkwardness, the child dropping its food at the table, and having a tendency to walk awkwardly or trip over things.

The disease may become so severe that the child is unable to feed or dress itself, or even to walk or to talk.

The commencement of the affection often can be traced to a fright or to overwork at school or other nervous strain. It also appears to be especially liable to develop in rheumatic children. Its great danger is that it may be followed by heart disease.

The child should be taken from school, and all sources of excitement removed. Sometimes confinement to bed is necessary. In all cases medical treatment is required.

Paralysis; Palsy.—A widespread or limited, more or less complete loss of power. There are various causes and forms of the disease. Sometimes the pressure occurring naturally during a tedious confinement, or less often that occasioned by the use of instruments, injures the brain, and both affects the mind and produces a *birth-palsy* as well. Generally the arm and leg of only one side are affected, yet both sides are not infrequently involved. This form of birth-palsy may improve considerably or may become worse with advancing years.

Sometimes a paralysis of one side of the face or of one arm occurs during birth from stretching of or other injury to a nerve, the brain having nothing to do with it. This variety will generally recover in a few weeks or months.

There is a *paralysis following diphtheria* which attacks especially the muscles of the throat and eyes, causing food to enter the back of the nose and producing squint. Occasionally it affects the whole body. Recovery is usually complete.

Paralysis of a somewhat similar nature, due to inflammation of the nerves not the result of diphtheria, is occasionally seen.

A *paralysis due to disease of the spinal cord* is frequent in children. The commonest form begins suddenly with fever, restlessness, sometimes convulsions, more or less delirium, and other vague symptoms. No diagnosis is possible until in a day or so paralysis of one or more extremities develops. Sometimes the onset is even more sudden, and a child, well on going to bed, is found paralyzed in the morning. Considerable improvement takes place, though slowly, but more or less loss of power and wasting of the limbs will probably remain through life.

Another form of spinal paralysis is that occurring in curvature of the spine. (See *Pott's Disease*, p. 304.)

The greatest perseverance in carrying out the treatment is necessary in all forms of paralysis. The affected parts are frequently cold, and need to be dressed very warmly. After the acute stage is over thorough rubbing and kneading must be kept up day after day for months in the effort to maintain and to increase the strength of the muscles. The physician in charge may advise electricity for the same purpose. The child should in most cases be made to use the paralyzed parts as much as pos-

sible. The use of crutches and other apparatus must not be begun unless absolutely unavoidable, as this is the most certain way to render them indispensable throughout life. If the doctor finds that the child really cannot learn to walk again, or is developing deformities in the weak limbs, he will probably advise some sort of brace which, with the help of a cane, may give the needed support and render crutches superfluous.

Hydrocephalus; Water on the Brain.—This is an enlargement of the head resulting from a great accumulation of fluid within the skull. The head and the fontanelles grow constantly larger, the latter bulge, and the bones become thin. The shape is somewhat globular, so that the face seems small and the head very large, the forehead overhanging the face, and the sides of the head extending beyond the ears. In mild cases the mind is not affected, but in severer ones the child is feeble-minded and has little control over its body.

Feeble-mindedness; Idiocy.—Idiocy—which differs from imbecility and feeble-mindedness only in degree—is a condition which is often born with the child, although it may develop in infancy or childhood as the result of some disease or from injury to the brain. A congenitally weak-minded baby does not notice as soon as it should. It will perhaps not follow a bright light with its eyes, nor turn its head toward the source of a noise, long after a normal child does both of these acts. As it grows older it is very slow in learning to hold up its head, to sit up, or to hold objects in its hands. Even by two years of age it may make no attempt to walk or to utter any distinctly-articulated sound. Its face has a vacant expression and it slobbers a great deal. At three or four

years of age it may have learned a few words or may still be unable to speak or to understand at all.

This description is of a well-marked case. There are all grades of the condition, however, down to what may be called simply *backwardness*, in which the child's powers are slow in developing, but finally expand to a fairly satisfactory degree if carefully trained. The mother must be able to recognize the mental defect as early as possible, with the intent that she may lose no time in beginning the training. The success at best is slow, and efforts must be unremitting and be uninfluenced by discouragement. Generally it is better to place the child in an institution where its education can be superintended by those accustomed to this work.

Deaf-mutism.—This resembles idiocy so closely for the first few months of life that its recognition is difficult or impossible. A deaf-mute takes no notice of sound because it cannot hear it, while a feeble-minded baby hears, but has not the sense to notice it. By the age of six months we should be able to decide between the two conditions. A deaf baby shows by this time none of the bodily feebleness or lack of development of the idiot. It has an intelligent expression, and will play with toys and smile at its mother, yet will take no notice of such a sound as that of a bell rung behind it. Very loud noises may make an impression upon it, either because it is not totally deaf or, more often, because it *feels* such vibrations as come, for instance, from the slamming of a door. The child's ears should at once be examined by an aurist, in order that something may be done, if possible, before it is too late. If found incurable, the child should when older be trained to talk and understand by lip-reading, in which so much success has been attained

in recent years, and which is so superior to the awkward deaf-and-dumb alphabet. There are institutions which are devoted solely to this instruction, and children often learn articulate language so well that they talk audibly and understand almost as though they could hear.

Congenital Blindness.—This sometimes at first resembles idiocy, which, indeed, not infrequently accompanies it. Only time can show the difference. A feeble-minded child will eventually learn to fix its eyes upon objects unless it is an absolute idiot, in which case its mental deficiency will show itself in other ways as well.

Inflammation of the Eyes.—This affection may occur at any age. The most dangerous form (*ophthalmia of the new-born*, *ophthalmia neonatorum*) is that which develops a few days—usually about three—after birth, and which may cause blindness in spite of the most careful treatment. To prevent this the eyes should be carefully washed after birth, in the manner described in Chapter IV. Should the inflammation begin, the lids stick together after sleep, and pus may be found at the corners and on the inner surface of the lower lid. The lids soon swell greatly, and their lining and that of the eye itself is very red and secretes an abundant thick discharge. As this is very infectious, the nurse must carefully keep any of it from getting into her own eyes or those of the mother or of other children, while at the same time the baby's other eye, if sound, must be guarded by an antiseptic bandage. A physician must be summoned without a moment's delay, since thorough and early treatment of a cleansing and disinfecting nature is essential. The nurse must see that the eye is kept

scrupulously clean by very frequent washing, and that the lotion ordered really gets inside the lids. To accomplish this the baby should be held on the lap, with the head inclined backward and toward the diseased side. The lids must then be gently separated and the lotion dropped in from an "eye-dropper." This consists of an ordinary medicine-dropper, but with the point smooth and rounded or bulbous to prevent accident. Absorbent cotton wet with the lotion should be first used, in order to remove any secretion from the lids. The lower lid is then drawn down slightly and some of the fluid is squeezed upon it from the dropper. Some is also made to pass beneath the upper lid. The solution should enter at the corner next the nose. The inclination of the head carries it through toward the cheek, thus keeping it away from the sound eye. The sticking of the lids may be prevented by rubbing their edges with a little vaseline. Any cotton or cloths used for washing the eye should be burned, and the nurse should disinfect her hands after each treatment of the child and before she touches her own eyes (Appendix, 100, 101).

Older infants and children may suffer from various forms of inflammation. In some of the severer cases minute blisters or ulcers develop upon the front of the eyes, and children cannot be persuaded to open them at all on account of the great pain which light produces. As it is difficult to distinguish between the serious and the trifling inflammations, a physician should be consulted promptly. Previous to his visit the eyes may be bathed frequently with cold water, and a little soothing eye-wash dropped into them often (Appendix, 85). No poultice or bandage, or any of the numerous eye-washes sold in the shops, should ever be used without a physician's advice.

Sometimes the edges of the lids become chronically red

and inflamed, and the growth of the eyelashes affected. This occurs usually in children whose health has been impaired, or sometimes in those exposed to too much sunlight.

Styes.—Small inflamed swellings on the edges of the lid, especially in older children, which form in a few days and then subside, or soften and discharge, or, finally, persist in the form of little tumors. Some children are very liable to have styes repeatedly, while others never do. Often the general health is at fault, and demands tonics; while in many cases, particularly in school-children, there is some defect of vision which needs examination by an ophthalmologist. This is especially the case in children who constantly develop styes. For the relief of a stye already present the frequent application of small, very hot fomentations is the best method of home treatment.

Squint; Strabismus.—Strabismus may be either convergent, producing a condition of "cross-eye," or divergent, so that one eye turns outward. Either one or both eyes may be affected. Of course, the mother can do nothing; but there is one thing she must *not* do, namely, neglect it. Not only does strabismus detract greatly from a child's good looks, but it will finally produce great impairment of the sight of the affected eye. Treatment by a skilled ophthalmologist ought then to be commenced very early in life.

Inflammation of the Ears; Earache; Running Ears.—Earache is, of course, only a symptom of different forms of inflammation of the ear which may or may not

go on to the formation of pus. The child may develop pain suddenly in the night, although it was well or had only a slight cold in the throat or nose when it went to bed. The chief symptom in infants is loud, persistent crying, not relieved by anything, and sometimes made worse by pressure just in front of or just behind the affected ear. Occasionally a baby will raise its hand to the seat of pain. Older children can easily locate the pain, although they sometimes refer it to the teeth. There is usually fever and some degree of deafness. The pain may subside after a few hours, or may continue with intermissions even for days. If pus is produced, it will finally perforate the drum-membrane and be discharged, probably with relief of pain. If insufficiently cleansed, the ear often has a very offensive odor. No medicine of any kind should be dropped into the ear, and no poultice or other wet dressing kept over it. A hot-water bag or bottle held to the ear will often remove the pain in a little while. Relief may be obtained by repeatedly syringing the ear with water as hot as can be borne, the mother first testing this against her cheek; or the child may be laid on the sound side and the water be poured into the affected ear. It should then be turned over to allow the water to run out, and the ear finally be covered with hot dry flannel. The procedure must be repeated frequently. The child should be kept quiet and warm, and the temperature of the room should not be less than 70° F. The diet should be light. A laxative and a fever mixture (Appendix, 108) aid in relieving the inflammation. If the pain persists or if pus is discharged from the ear, it is best to consult a physician, since, apart from the chances of permanent deafness, there is always danger that inflammation may extend to the brain. In cases of discharge from the ear the

mother may very gently syringe the canal with warm water as often as is necessary to keep it clean, but should put no plug of cotton into it unless the child is going into the open air. The best syringe for her to use is a small bulbous one, called the "Ear and ulcer syringe," which is made of soft rubber throughout (Fig. 79).

FIG. 79.—Ear syringe.

Toothache.—This occurs most frequently after infancy is passed, and is generally due to neglected decay of the teeth. The pain is often intense. A hot-water bag held against the face frequently gives relief. Sometimes a cavity can be discovered in the affected tooth. If a very small bit of cotton is moistened with oil of cloves, and packed well into this, the pain may be relieved. Of course, a child should see a dentist as soon as possible in order to prevent a return of the trouble.

(4) DISEASES OF THE BONES, MUSCLES, SKIN, ETC.

Deformities of the Head.—An alteration in the shape of the head may occur as a result of prolonged pressure received during birth. The deformity is due partly to the displacement of the bones, but chiefly to swelling of the scalp. Attention is called to it here because it is often the source of great though entirely needless anxiety on the part of the mother. If it is let alone, it will be all right in a few days. On no account should any attempt be made to squeeze it into shape. A distorted and marked head is sometimes the unavoidable result of delivery by instruments. Here, too, the traces of deformity will usually disappear in a short time. In exceptional cases a lump on the head, even as large as an egg, is produced by an

accumulation of blood under the skin, or in other very unusual instances by a portion of the brain or its membranes protruding through an unnatural opening in the skull and elevating the skin over it. Such a deformity as the latter does not, of course, disappear. In hydrocephalus and in rickets there is a deformity of the head characteristic of each respectively—in the one globular and in the other square. These deformities are better considered in connection with other symptoms of the two diseases.

Protruding Ears.—Mothers are often exercised greatly over a too great prominence of the baby's ears. Probably little alteration in the shape can be accomplished in most instances, and it is better not to meddle with them. A cap or a network bandage may be worn during sleep, to keep the ears from being bent by the pillow, and to press them inward somewhat. A slight operation may be performed in bad cases to bring the ears closer to the head.

Deformed Hands and Feet.—Children are sometimes born with *supernumerary digits* on the hands or feet, or with *webbing of skin* between the fingers or toes similar to that seen in a duck's foot. Any operation required should be done early.

Club-foot is a distorted shape of the foot, in which, most commonly, the front part of the foot is turned inward and the heel is raised. Sometimes there occur contractions of the foot into other forms. The condition may be present at birth or may be acquired. Treatment should begin immediately and be persevered with. The application of a splint or of some apparatus and the frequent manipulation of the foot will effect a cure in

many cases. In others there must be an operation as well.

"*Pigeon-toed*" is the name applied to the inward rotation of the legs in walking. It is the natural condition in early childhood, and usually disappears with time and training. It is important to be sure, however, that it does not depend on the presence of bow-legs or club-foot. Occasionally in simple pigeon-toe a shoe or other apparatus is required to keep the toes turned out, but this can be fitted properly by a surgeon only (Fig. 80).

FIG. 80.—Pigeon-toed.

Ingrowing toe-nail is a condition in which the edge of the nail, usually of the great toe, is pushed into the flesh, which rises above it. It will not often develop if the shoes have been made of proper size and shape and the toe-nails have been cut according to the directions previously given (p. 85). Should the deformity be already present, a small quantity of cotton should be packed under the corner of the nail, in order to raise it above the flesh. The nail must be cut square or, still better, concave across, with a notch in the center (Fig. 81), and should also be scraped thin down the middle with the edge of a knife. The corners should never be rounded off. If the disease has advanced too far for this plan of treatment, the advice of a physician must be had.

FIG. 81.—Method of cutting an ingrowing toe-nail.

Bow-legs; Knock-knee.—These two conditions (Figs. 82 and 83), one the opposite in appearance of the other, are generally dependent upon rickets combined with the

allowing of the child too soon to bear its weight upon its feet. Not infrequently the application of too thick a diaper after the child begins to walk produces bow-legs by forcing the thighs apart. Keeping the child off its feet as much

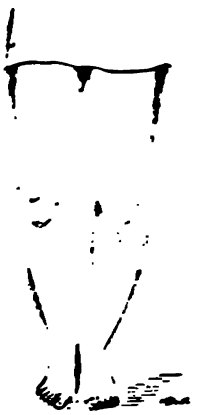


Fig. 82.—Bow-legs

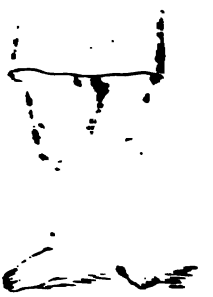


Fig. 83.—Knock-knee

as possible, the persistent use of massage and, in the case of bow-legs, the use several times a day of gentle pressure with the hands in a manner tending to straighten the curve will often in the long run be effectual. There is a natural tendency for the bowing to disappear as the child grows older, but as the matter is an important one the advice of a physician should always be obtained.

Hip-joint Disease.—A tubercular inflammation of the hip-joint, the results of which are so serious that every mother should be on the alert to recognize its insidious onset. One of the earliest symptoms is pain, in some cases situated in the hip itself, but very often felt only in the knee. The child is prone to start suddenly from sleep, suffering from pain. Very soon some degree of

lameness comes on, lasting at first for a few days at a time. The child often tries to rest the affected hip by standing on the sound leg. Parents may make a fatal mistake at this period by attributing the symptoms to the existence of "growing pains" or of weakness of the knees. A physician should be called in without delay, for the recovery is tedious at the very best. In many cases abscesses form, and even life is lost.

Curvature of the Spine.—There are three forms of this affection, very different in nature and cause, which

FIG. 84.—Lateral curvature of the spine.

may be mentioned here. In the first, called *lateral curvature*, the spine makes an S-shaped curve, as shown by the illustration (Fig. 84). Rickets is the commonest

cause in young children, while a faulty position in sitting at school, or the carrying of some weight (as a baby-brother or baby-sister) always upon the one arm, produces it in older children. It is much commoner in girls than in boys. Mothers should not fail to examine their children for the defect at intervals. The disease consists in weakness of the articulations and muscles, but not of the bones. The treatment must be directed by a physician. Such gymnastic exercises and the assumption of such positions are required as will mechanically correct the deformity.

FIG. 85.—Slight degree of the curvature of the spine of Pott's disease.

The second variety of curvature, called *caries of the spine*, *Pott's disease*, or *angular curvature*, is due to tubercular softening and destruction of the bones of the spine, and is of so grave import that its earliest symp-

toms should be reported to the physician. It is rare before the age of two years. A fall or blow seems sometimes to start the process, but the majority of cases are in no way due to injury. One of the earliest symptoms is a peculiar stiff, tottering walk with a tendency to fall forward. The child moves the back rigidly and as a whole in order to avoid any jarring. It will not bend the back to pick up anything from the floor, but does it by bending the knees. If the trouble is higher in the spine, the shoulders are sometimes carried "shrugged up" and the neck stiff. Where the disease is low in the spine the child sometimes has a disposition to walk leaning forward, with the hands at times upon the thighs. Pain felt at the seat of trouble is usually present. Early in the disease pain is very often felt in the abdomen, and resembles a stomach-ache caused by indigestion. Sooner or later there develops a slight prominence of the spine which only a skilled eye may detect. Eventually the prominence becomes quite visible (Fig. 85), and it may even result in great deformity.

FIG. 86.—Rickety curvature of the spine.

The third form, the *rickety posterior curvature*, occurs in severe cases of rickets in infancy (Fig. 86). It is due to the same articular and muscular weakness which produces lateral curvature, but it consists of a very long rounded curve extending posteriorly and occupying nearly the whole length of the back, while in Pott's disease the curve is at first more angular, short,

and small. It will disappear when the other symptoms of rickets are removed.

Ulceration of the Navel.—Instead of drying up properly the navel cord sometimes becomes soft and ill-smelling and leaves an ulcer after falling off. General blood-poisoning of the infant may easily follow disease of the navel. In some cases a pea-sized red protuberance can be detected within the navel, and from this comes a little discharge which irritates the surrounding skin. Frequent thorough dusting with a powder consisting of boric acid and oxide of zinc (Appendix, 95) will often effect a cure promptly. If not, the family physician may have to cauterize the ulcer, or perhaps cut off the protuberance.

Bleeding from the Navel.—Slight oozing of blood from the navel is not infrequently seen after the cord has fallen. It is generally the result of lack of gentleness in washing and dressing the ulcer which has remained. No special treatment is required. If the bleeding grows steadily greater in amount, it constitutes a very serious but fortunately rare disease. A sudden profuse hemorrhage may be the result of the loosening of the ligature or, later, the giving way of a large vessel in the navel wound. Firm pressure made between the finger and thumb must be kept up until medical aid can be had.

Birth-marks; Mother's-marks.—Under this heading are included both *nævi*, as physicians call them, and *moles*. A *nævus* consists of a red or purple patch on the skin, sometimes on a level with it, sometimes elevated above it. Although usually small, it is occasionally extensive, and in some instances it is disposed to grow, and may then prove dangerous. A *mole* is a dark pigmented

area in the skin, either flat or elevated, smooth or covered with hair. It is generally small, but sometimes is of sufficient size to cause great disfigurement.

Contrary to the popular belief, birth-marks are in no way dependent upon impressions made upon the mind of the mother before the child was born (compare page 25). Treatment can be prescribed only by a physician. Cauterization or some more serious operation may be needed, and some birth-marks cannot be removed at all.

Warts.—These disfiguring growths are most common in children. They are apt to develop rapidly, and often to disappear quite as quickly without treatment. There is no real evidence that charms have any curative value whatever, and most of the applications recommended are equally useless. The warts are best let alone or cauterized by a physician.

Red Gum; Strophulus.—Titles formerly applied to a red, pimply eruption from which babies often suffer during the first weeks of life. The rash is generally either eczema, erythema, or prickly heat.

Prickly Heat; Miliaria.—A very common affection in infants, consisting of an eruption of numerous minute red elevations (papules), or of pinhead-sized, inflamed blisters (vesicles), or of both together (see page 320). These are closely crowded, particularly where there is much perspiration, as about the neck and over the trunk. The disease begins very suddenly and is attended by more or less burning and tingling, but seldom by the very intense itching of eczema. The latter affection, moreover, usually develops more slowly and its vesicles show a greater tendency to run together. Prickly heat is seen

chiefly in hot weather, and especially in children who are too warmly clothed and who perspire profusely as a result of this. Treatment consequently consists chiefly in avoiding or removing the cause. The clothing must be made as cool as the child can wear with entire safety. It is particularly in children disposed to prickly heat that woollen underclothing must often be replaced in summer by cotton material (see p. 88). The irritated skin may be dusted with a camphor-and-zinc powder (Appendix, 94) and the child given a laxative alkaline mixture (Appendix, 106) or a dose of magnesia and a light diet. Sometimes the itching is relieved by a solution of a teaspoonful of baking-soda in a pint of water, dabbed on and allowed to dry. If recovery does not follow in a very few days, medical advice should be obtained.

Eczema.—A troublesome disease, particularly common in infants, lasting days, months, or occasionally even years, and limited to a large or a small area, or in rare instances covering the entire body. The special tendency to suffer from it disappears in most cases by the end of the first year, although it is frequent at all periods of life. Among the principal causes are inherited tendency, debilitated constitution, imperfect hygiene, improper diet (particularly in infants the early use of starchy food), over-feeding, digestive disturbances, free perspiration, irritating soap, the contact of soiled diapers, any other local irritation, etc. Often no cause can be discovered. In fact, the disease is very frequent in children who seem the picture of health in other respects. The commonest situations are about the head, the crotch, the groins, and the folds of the joints in general. In the most frequent form the skin becomes bright red and covered with minute, pinhead-sized vesicles. These soon rupture, leaving the surface swollen, red, and

moistened with a watery discharge which may thicken and form crusts with raw flesh beneath. In another form the skin is dry, red, thickened, and somewhat scaly, and perhaps cracks easily. In still another common variety numerous small pustules develop; while in another the eruption is chiefly composed of papules (see p. 320). The attack is attended by itching which is often so intense that the child is nearly frantic. This is generally worse at night, and may prevent sleeping. Owing to the disposition of the rash to spread, every case should early be put under a physician's care. The treatment open to the mother is to remove the cause if it can be found. Besides this she may give a laxative at the outset, reduce the quantity and the strength of the food, hinder scratching by putting the hands into mittens or fastening them to the sides, or even by putting straight padded pasteboard splints about the elbows, prevent any friction of the skin from rough clothing, cease to employ soap, use no more water on the diseased part than is absolutely necessary, and employ a lotion of starch and boric acid instead of plain water for cleansing (Appendix, 83). The skin, if red and weeping, may be dusted frequently with a drying powder (Appendix, 96). Surfaces which touch each other must be separated by placing between them a thin layer of absorbent cotton or patent lint well filled with the powder. Soaking in sweet oil may be employed to remove any crusts.

Hives; Nettle-rash; Urticaria.—Few or numerous distinct raised blotches, pinkish or whitish in color, and of a size which, although having a considerable range, averages that of the finger-nail. They often resemble closely the elevations produced by the stings of insects. A crop of hives comes out with great suddeness, lasts a few hours or a day, and is then, perhaps, succeeded by

another, the whole attack persisting for two or three days or sometimes becoming chronic. The burning and tingling are often intense. The commonest cause is some disturbance of digestion. Sometimes one certain article of diet will, without affecting the digestion, always produce nettle-rash in one child, and another article will have the same effect in another child. Among the foods most liable to act in this way are fish, shell-fish, strawberries, pineapples, mushrooms, and sausages. Sometimes the presence on the skin of a single insect, as a hairy caterpillar or a flea, may bring out a large crop of hives. Contact with the stinging-nettle or with the jelly-fish may produce the rash. The treatment usually efficacious for mild cases consists in giving a dose of magnesia followed by a laxative alkaline mixture (Appendix, 106) and reducing the diet temporarily. The skin may be powdered frequently with camphor-and-zinc powder (Appendix, 94), or the spots dabbed with absorbent cotton wet with equal parts of vinegar and water or with a special cooling lotion (Appendix, 89). In cases which tend to be chronic or to recur frequently the great aim must be to search for and remove the cause. Starch-and-soda baths (Appendix, 48) often do great good, but the disease ought to be treated by a physician if it lasts more than a few days, as it is sometimes most difficult to cure.

Chafing; Cracks; Roughness of the Skin; Chapping.—*Chafing* may occur wherever two moist surfaces of skin are constantly touching each other. It is common in the folds of the neck in fat babies, in the armpits, and about the buttocks, thighs, and groins. In the latter localities it is liable to be produced by a too infrequent changing of diapers, particularly if there is an irritating diarrhœa. When the attack is severe the skin is bright

red, tender, moist, and looks almost raw. In children disposed to it the disease may be prevented by ensuring great cleanliness and by the use of starch-water for washing, followed by a thorough drying and dusting with a talc powder. When there is diarrhœa, the free application of vaseline helps to keep the skin from becoming moist. To cure chafing already present the methods mentioned must be followed, and, in addition, pieces of lint previously dusted with an astringent powder (Appendix, 96) should be placed in the folds between the affected surfaces.

Cracks are generally produced in the same way as chafing, and are in reality of the same nature. Those in the folds of the neck are sometimes very difficult to heal. The frequent application of a hot wet sponge followed by careful drying may be of benefit.

A general *roughness of the skin* is generally best treated by thorough rubbing with olive oil or vaseline after bathing.

Chapping of the hands and face usually results from exposure to cold. It is best prevented by protecting with veil and gloves. The treatment is much the same as for roughness of the skin.

Stomach-rash; Tooth-rash.—Terms often used by mothers to designate many sorts of rashes seen in infants. They are more properly applied to an eruption of *erythema*, that is, of a diffuse redness or of distinct, pea-sized, scarcely elevated spots which appear very suddenly, last a few hours or days, and produce no irritation. This often develops in infants suffering from some digestive disturbance. Treatment is generally not required, other than that for the indigestion.

Boils and other Pustular Eruptions.—In a strictly

medical sense, a boil, or *furuncle*, consists of an elevated rounded or conical, dusky-red, painful, and very tender swelling which contains pus. When it bursts it is found to have a distinct "core" of dead tissue. Furuncles may be single, but are very apt to occur several at a time and in successive crops. Impairment of the general health or, in babies especially, chronic digestive disturbance causes them in many cases, but some children have a peculiar predisposition to them, although apparently well in other respects. The disease, however, is never a sign of robust health, as has sometimes been supposed.

There are various other pustular eruptions which are popularly known as "boils," but which are named otherwise by physicians. Some of these are the result of most unfavorable hygienic conditions; others are evidences of eczema; others occur entirely independently of any affection of the general health or digestion; others constitute a peculiar acute contagious disease; and still others are the result of syphilis. The only treatment of pustular eruptions which is justifiable without the advice of a physician is the protecting of the affected parts or the smearing them with a little pure ichthyol. Poultices must never be applied unless ordered. When used, they should be mixed with a boric-acid solution (Appendix, 79) instead of with plain water, or, still better, the dressing should be the antiseptic poultice described later (Appendix, 66). Tonic treatment and change of air are needed in many cases.

Fever-blisters.—Small groups of minute, closely-crowded blisters (vesicles, see p. 320) which contain a clear watery fluid, and which, if not ruptured, dry into a crust. In many children slight fever, such as accom-

panies a cold or indigestion, will invariably produce them. They are generally situated on the lips or the edges of the nose, although in bad cases they may spread over the face or below the chin. The spots should be smeared twice a day with pure ichthyol or with a zinc-and-bismuth ointment (Appendix, 72).

Dandruff; Milk-crust.—Young babies often show a tendency to an excessive production of oily scales upon the head. Unless carefully watched, these will accumulate in large yellowish patches commonly known as "*milk-crust.*" Some mothers have a mistaken notion that this should be carefully let alone. Great cleanliness will prevent any such accumulation, and rubbing the head daily with a boric-acid ointment (Appendix, 74) will often check the excess of oily secretion. A patch already formed should be removed by soaking it with warm olive oil and then washing it with Castile soap and warm water. A fine-tooth comb should never be used on it. When the patch is found to have a raw, weeping surface beneath it, it is not simply milk-crust, but eczema, and should be treated accordingly.

In older children there is often a production of dryer scales, or *dandruff*, which are without the very oily character, and which consequently fly about when the hair is brushed. The scalp should be washed frequently with water and one of the German salicylic-acid or sulphur superfatted soaps. If dandruff persists, a physician must be consulted, since falling of the hair may follow.

Ringworm.—A common and very contagious affection, due to a microscopic, mould-like, fungous growth. On the face and body it occurs much more frequently in childhood than later, and on the scalp it is found at this time

of life only. In the former situation it consists of a single, dull-red, more or less circular spot, which gradually enlarges into a patch with a red, somewhat scaly border and a paler, more natural centre. This ring-like shape gives the name to the disease. On the scalp, which is by far the commonest situation, the patches are numerous, circular, and little, if at all, red. The hair comes out, leaving the spots more or less bald, and often covered with fine scales and with short brittle stumps of broken hairs which can be pulled out easily. This latter is a characteristic symptom.

The cure of ringworm of the scalp is so difficult and so tedious at the best that no mother should dream of undertaking it. Her province is to follow directions carefully and to see that other children, her own as well as those of other people, do not catch it. The affected child must on no account be sent to school, and all its toilet articles must be kept strictly for its own use. Some sort of skull-cap may be worn to prevent the germs from getting about. The sooner a physician sees the case the greater the chance of getting it under control.

Ringworm of the body is much more easily cured. An ointment such as that given in the Appendix (73) may be rubbed into the spot twice a day for a week or longer; but here, too, a wise mother will not undertake the care of the case herself.

Itch; Scabies.—An intensely itching and very contagious affection of the skin, due to the presence of a minute insect which burrows under the surface. The disease may attack any age from infancy up. Although commonest among the poor and dirty, it may by contact with them be contracted by the cleanest child. Examination shows scattered, small pimples, which may oc-

cupy any part of the body, but which are usually first found on the sides of the fingers. The toes, armpits, buttocks, and the central parts of the body are also favorite seats. Sometimes a few irregularly shaped ridges, one to ten lines long, show themselves here and there and make the diagnosis certain. They are the burrows in which the female insect lays her eggs. Often, however, the itching is so intense, and the skin so irritated and torn by the scratching which this incites, that the original characteristic appearance is destroyed and the diagnosis may be difficult. If several children of one family, and perhaps the parents as well, are suffering from an itching eruption, it is pretty certain that the disease is the itch. Treatment is almost beyond the power of the mother, for the applications necessary sometimes produce decided irritation which must be checked. As contagion takes place by the clothing and the bed-linen, particular attention must be given to their disinfection.

Lice; Pediculi.—Although these little insects are by right the inhabitants of the unwashed, any child, no matter how clean, may be infected by them through some accidental contact with another. When once in possession, they are not killed by the simple washing of the head with soap and water. The first symptom is a very decided itching of the scalp. The scratching which this causes, and the irritation by the animals themselves, set up an inflammation, and produce pustules and matting of the hair if the case is severe. Eczema situated at the back of the head is in most cases the result of the presence of lice. Careful inspection shows the minute oval eggs (*nits*) attached by one end to the hairs. The careful use of a fine-tooth comb will probably remove some of the animals themselves. Many different applications are

equally serviceable, but some of them are quite irritating. One of the safest and most popular is the ointment of stavesacre (larkspur-seeds), which should be rubbed upon the scalp several days in succession. Kerosene is also a good application, but must not be applied near a flame of any sort. The hair meanwhile should be washed repeatedly with vinegar in order to destroy the nits. With proper care long hair need not be cut.

There is one species of lice—body-lice—which infests the clothing only. The remedy consists in entire destruction or baking of the infested garments and the placing of the child in a disinfectant bath (Appendix, 102).

(5) INFECTIOUS DISEASES.

Of the numerous infectious diseases, we may consider typhoid fever, small-pox, chicken-pox, vaccination, scarlet fever, measles, German measles, erysipelas, diphtheria, mumps, whooping-cough, and influenza. Certain other diseases which are known to be infectious, such as ringworm, and others which are now believed to be so without much doubt, such as pneumonia and rheumatism, are considered in other sections for the sake of convenience.

They are called *infectious* because due to microscopic germs which are capable of being transmitted from persons with the disease or from other sources and of infecting the system of others. Most of these are *contagious* as well as infectious, *i. e.*, they can be acquired by contact with a diseased person. Malaria is an instance of a disease which is infectious because due to a microscopic germ, but which is not contagious, because it cannot be contracted from another person. All the diseases enumerated in the opening lines of this section are both contagious and infectious. The infection may be by direct contact, or the germs may in

some cases be carried by another person or by water, food, clothing, books, letters, etc. The germs of some of the diseases have a great tenacity of life. A case of contagious disease is always the result of some other case from which the contagion comes, even though we are not able to trace the connection. All of the diseases mentioned, with the possible exception of whooping-cough, are accompanied by more or less fever. Some of them are called *eruptive fevers*, because there is a characteristic eruption or rash upon the skin. Treatment is entirely the province of a physician. There is absolutely no way known to avoid contracting them except by keeping away from the contagion. The carrying of disinfectants about the body, such as bags of camphor or carbolized substances, is entirely useless. The recognition of the existence of one of the infectious diseases is beyond the mother's skill in many instances, while in others it is comparatively easy. The table which follows gives in convenient form information regarding these diseases, which will be of value to a mother desirous of understanding something of their nature.

Physicians use certain terms as applied to infectious diseases, which may conveniently be described in this connection. The *day of the disease*—as the "first day" or the "third day"—is in accord with the ordinary method of dividing time, and does not indicate the number of times twenty-four hours have elapsed since the symptoms first appeared. Thus, if the onset of symptoms occurred, for instance, at 10 P. M. on Tuesday the 14th, the "second day of the disease" does not begin with 10 P. M. on the 15th, but is counted from midnight of the 14th—the time when Wednesday the 15th begins, although this is only two hours after the onset. The stage of *incubation* denotes the period which elapses between exposure to contagion and the appearance of the

TABLE OF INFEC

Disease.	Incubation lasts—	Date of Characteristic Symptom from beginning of Invasion.	Characteristic Symptom.
Typhoid fever.	7 to 10 days.	7th or 8th day.	Rose-red, slightly elevated spots.
Scarlet fever.	1 to 7 days.	1st or 2d day.	Intense, bright-red blush over body.
Measles.	10 to 11 days.	4th day.	Dusky or purplish-red, slightly elevated spots, scattered and in characteristic groupings.
German measles.	7 to 21 days.	1st day.	Pale, rose-red spots or uniform blush; no characteristic groupings.
Chicken-pox.	13 to 17 days.	1st day.	Pea-sized, scattered vesicles.
Varioloid (Variola).	7 to 12 days.	3d day (may be 1st or 2d).	Red, elevated papules; then vesicles; then often pustules.
Vaccinia (Vaccination).	1 to 2 days.	1st day (3d after vaccination).	A red papule, becoming a vesicle and then a pustule; surrounded by a broad red area.
Erysipelas.	3 to 7 days.	1st or 2d day.	Bright-red blush; puffy skin; often vesicles.
Diphtheria.	2 to 12 days.	1st or 2d day.	White membrane on tonsils and other parts of throat.
Whooping-cough.	2 to 7 days.	7th to 14th day.	A prolonged paroxysm of coughing followed by a crowing inspiration (whoop).
Mumps.	7 to 21 days.	1st day.	Swelling in front, below, and behind the ear and below the jaw.
Influenza.	Uncertain. Probably 1 to 7 days.	1st day.	Fever, prostration.

first symptoms. The stage of *invasion* is the time following incubation, in which there are distinct evidences of illness, although the characteristic symptom (such as the eruption in measles or the whoop in whooping-cough) has not appeared. Symptoms seen during this

TIOUS DISEASES.

Other Principal Symptoms.	Whole Duration of Disease from Onset.	Quarantine lasts from Onset—
Apathy; diarrhœa; nose-bleed; headache.	2 to 4 weeks.	While disease lasts.
Sore throat; often vomiting with onset.	7 to 9 days or more (not including desquamation).	6 weeks.
Cold in head; running eyes; cough; hoarseness.	7 to 8 days.	3 weeks.
Slight sore throat; sometimes slight running of eyes and nose.	3 to 4 days.	3 weeks.
None; or slight fever.	A week or less.	3 to 4 weeks.
Headache; backache; vomiting.	About 14 days.	4 to 8 weeks.
Often feverishness and malaise.	About 3 weeks.	None.
Fever; pain.	4 to 6 days, or several weeks if it spreads.	Averages 2 weeks.
Debility; fever.	10 to 14 days.	3 to 4 weeks.
Vomiting; spitting of blood.	6 to 8 weeks	6 to 8 weeks. (while whoop lasts).
Pain when chewing.	A week or less.	3 to 4 weeks.
Various respiratory, digestive, or nervous symptoms, commonest being general aching and cough.	3 or 4 days to two weeks or more.	While disease lasts.

period are called *prodromal* or *initial*. The first day of invasion marks the *onset* of the disease, and from this day the duration of the disease is dated. Next comes the stage of characteristic symptoms called the *eruptive* stage in the case of eruptive fevers. Sometimes the

invasion lasts less than a day, as, for instance, in chicken-pox, and the characteristic symptoms then appear on the first day of the disease; that is, there is no evident stage of invasion. *Desquamation* is the shedding of the skin which follows in some of the fevers. The duration of the contagiousness, throughout which the child should be kept from mingling with others, is sometimes called the period of *quarantine* or of *isolation.*

Certain other terms are used in speaking of some of the eruptive fevers and of certain skin diseases. A *vesicle* is a little elevated blister, the size of a split pea or smaller, filled with a clear, watery fluid. A *macule* is a small red spot not elevated above the skin. A *papule* is a red, pimple-like elevation. A *pustule* is shaped like a papule or a vesicle, but contains pus.

The following is a much abbreviated review of the infectious diseases, supplementary to the table and containing chiefly facts not mentioned there. The special nursing required, particularly as regards disinfection of the room, clothing, etc., is described in discussing the Trained Nurse and the Sick Room in Chapters IX. and X. The final disinfection of the child is accomplished by a disinfectant bath (Appendix, 102).

Typhoid Fever.—Somewhat less often seen in children than in adults, and less severe; less common under three years of age, yet developing not infrequently in infants under a year; occurring oftenest in autumn. It is but slightly contagious, for it is transmitted only by the germs from the bowel-movements contaminating the drinking-water or the food of others. As a rule, one attack protects from subsequent ones. Symptoms of invasion begins very insidiously in children, and consists of debility, loss of appetite, fever, often vomiting, nose-bleed,

and occasionally diarrhœa. The last symptom is much less frequent than in adults. Sometimes, especially in young children, the onset is much more sudden. The fever gradually increases for a week, then stays high (103° to 104°) for a week or two, but with a very characteristic difference between the morning and evening temperatures, and then gradually diminishes. Very frequently children scarcely feel sick at all, and the disease in them may stop much short of the usual three or four weeks. Nearly always there are a peculiar apathy and somnolence present. In some cases, however, especially in children, there is an unusual degree of wild delirium, and meningitis is suspected. The characteristic rose spots may be only few or may be very numerous. They are found chiefly on the trunk, and especially on the abdomen, come in successive crops, and continue to appear until the disease is nearly over. They are slightly elevated, oval, rose-red, and about one-sixth of an inch long, and disappear momentarily when pressed upon. Inflammation in the bowel is always present, and ulcers are liable to form; and if the thin, paper-like wall of one of these ulcers perforates, death almost certainly follows in a few hours. We can easily see, then, the tremendous importance of very soft food, especially milk, and of absolute rest in bed and the use of a bed-pan, no matter how slightly sick the child may seem. Yet the danger of perforation is very much less, especially in quite young children, than it is in adult life. Since the germs are contained in the passages only, these should be disinfected as soon as passed (Appendix, 98). The bed-linen and bed-clothes also ought to be disinfected.

Scarlet Fever; Scarlatina; Scarlet Rash.—The different names mean exactly the same. The disease is one

of the commonest affections of children, occurs at any time of year, is rare under the age of one year and especially under that of six months, and is very contagious, yet less so than measles. The germs are generally believed to be transmitted especially by the mucous secretions and by the scales from the skin, and can be carried in the clothing from the sick to the well. Their vitality is remarkable, for, attached to some garment, they may live for months. A second attack is of great rarity, as in nearly every supposed instance of it the child really had some other eruption on one of the occasions. The disease may be so mild that it is overlooked, or so severe that the child dies in a few hours. The lightest case is capable of giving the most severe form to other children. In a case of average severity the first symptoms are vomiting, fever, rapid pulse, and sore throat. The rash appears within twenty-four hours, usually first about the neck, and rapidly spreads over the whole body, although generally less developed on the face than elsewhere, particularly around the mouth. It consists of minute red points, not at all elevated, and so closely crowded that the skin appears a uniform bright red. As a rule, the eruption is widespread when the child is first examined. The color increases in intensity for two or three days, begins to fade in three or four days after the onset, and lasts in all about a week. At about the end of the first or second week the skin begins to peel in large or small shreds, and this characteristic desquamation continues several weeks. During the height of the disease fever persists, the throat is sore, swollen, bright red, and often seriously inflamed, and the tonsils may be covered with white patches resembling diphtheritic membrane. The tongue loses its coating and becomes bright red with the minute natural prominences unusually large

("strawberry tongue"). The rapidity of the pulse is greater than the elevation of the temperature would lead one to expect. The fever disappears in seven to nine days, and the acute stage is over. In bad cases with severe throat-symptoms fever may last much longer than this, while in the mildest cases the rash may disappear in twenty-four hours and there may have been but the slightest fever. The disease is always alarming, because the cases which begin mildly may eventually become severe, or be followed by inflammation of the ears, pneumonia, abscesses of the glands in the neck, or Bright's disease. The last-mentioned disease may come on even after the child has been convalescent from the fever for two or three weeks. It must be guarded against with especial care.

In the way of treatment, the slightest possible chance of taking cold must be avoided. The child should be confined to bed, and the windows must not be opened in the slightest, or any bathing or sponging employed, until the physician in charge is asked what he wishes done in the matter. Very often he will have the child oiled all over as an additional safeguard against cold and to keep the desquamating skin from getting about the room. Further preventive measures against spreading consist in isolating the child the moment the mother suspects that it may have scarlet fever, in carrying out careful disinfection during the attack, and in deferring the removal of quarantine until she is quite sure that the danger is over. The caution about bathing is given not because it expresses the writer's views on its danger, but because some physicians are greatly opposed to all bathing in this disease. It does not apply to the first hot bath, useful at the beginning of nearly any acute disease in children.

Measles; Rubeola; Morbilli.—Probably the most frequent and most contagious of the eruptive fevers; occurring oftenest in the cold season, and rarely in babies less than one year, or, especially, six months, old. It appears to be contagious even during the period of incubation. It is caught generally by close contact with infected children, for, although the infection can cling to objects about the patient and be carried by a third person, this occurrence is certainly rare. The germ has little vitality as compared with that of scarlet fever. Second attacks of measles, although more frequent than is the case with scarlet fever, are still very unusual. In the great majority of the reported instances so often heard of, the children in reality had measles upon one occasion and German measles or some affection of the skin upon the other. Measles is usually regarded as a disease of little consequence; but this is an error. In children not previously in good health it may prove fatal, generally by inducing pneumonia, tuberculosis, or some other complication. The attack begins with all the symptoms of a very bad cold, such as feverishness, sneezing, running of the nose and eyes, heavy, stupid expression of the face, hoarseness, and cough. The child is so often stupid and sleepy that the expression "sleeping for the measles" has become a common one. Frequently the onset is much milder, and the child is out of doors, very slightl sick. The rash begins upon the fourth day of the disease, in the form of purplish-red, slightly elevated, flattened papules about the size of a split pea. These appear first upon the face, but spread over the entire body in about twenty-four hours. Many of them remain distinct, while others unite by their edges and form irregular blotches and lines, many of which are crescent shaped. This grouping is very characteristic of the disease. Plate

PLATE III.

Girl with measles, showing the characteristic grouping of the eruption and the heavy and swollen appearance of the face. (From a photograph.)

III. is from a photograph of a child with measles, and shows very well both the nature of the eruption and the heavy, somewhat swollen face and thickened lips. All the symptoms mentioned persist or grow worse, and there may also be diarrhœa. By the sixth or seventh day of the disease the fever has ceased, and by the seventh or eighth day the rash has disappeared. There is often a faint mottling and a fine desquamation of branny scales lasting a week after the rash has gone. There is no peeling as in scarlatina. At the beginning of the attack a hot bath may be given, but other treatment will be directed by the physician. It is best to keep the child in bed about ten days, to avoid the danger of taking cold. Bright light should be excluded, since the eyes are inflamed.

German Measles; Rubella; Rötheln.—The term "French measles" is only an incorrect name for this disease. "Roseola" is another term very loosely used, and applied to other affections as well. German measles is just as distinct from ordinary measles as scarlet fever is. That a child has suffered from one of the three diseases protects it in no way from the other two. It is less common than these, oftenest seen in the winter-time, very contagious, rarely occurs twice in one person, and seldom attacks children under one year old. The contagion is transmitted as in measles. The disease is quite variable, in some cases resembling measles, and in others scarlet fever, so closely that even the attending physician cannot make a positive diagnosis. There are seldom any prodromal symptoms, or they are only those of a very slight cold, and are followed by the rash within twenty-four hours. This comes out first on the face as pale-rose, very slightly elevated spots, of the size of a pin-head up to that

of a split pea, which do not run together into distinct small blotches as in measles, although they do very often fuse into large areas of an almost uniform redness looking much like the rash of scarlet fever. The eruption spreads rapidly downward over the body, like a wave in that it fades rapidly also, and may have nearly disappeared from the face by the time it is fully out on the feet. It is gone from every part by the third or fourth day. The symptoms during the presence of the rash are very moderate fever with slight running of the eyes and nose and slight sore throat. Desquamation of a few branny scales often follows the rash. Care must be taken to guard against cold, as bronchitis or pneumonia may develop.

Chicken-pox; Varicella.—A very common and contagious disease, rarely occurring twice in one person, and not so often attacking those under six months of age—although this last is less true of it than of measles and scarlet fever. It resembles the mildest varioloid very closely, but is an entirely distinct disease. Contagion is transmitted by the breath or scabs, and exceptionally it is possible for a third person to carry it from the sick to the well. The disease is generally very mild. Prodromal symptoms are absent. The discovery of the characteristic rash is usually the first symptom, although sometimes there is slight fever and malaise for a few hours before. The eruption consists at first of rose-colored spots which usually appear first on the neck and trunk, and which change in a few hours into prominent vesicles, from a few to hundreds in number, one-quarter of an inch or less in diameter, filled with a clear watery fluid, and sometimes surrounded by a slight red halo. The vesicles come out in crops, the older ones rapidly drying and forming scabs. There may be mild fever during

the presence of the eruption. The attack lasts a week or less, although all the scabs may not be gone for some time longer. Plate IV., from a photograph, shows the vesicles dotted over the trunk in a moderately well-developed case of chicken-pox.

The child should be confined to the house, away from other children, or to bed if there is an extensive eruption. Other treatment is not often required. Care should be taken that the spots are not picked at or torn, as this increases the danger of leaving scars. If any vesicles have become very large and much pus seems to be forming under the scabs, they should be treated antiseptically by the family physician, in order to limit their size and to prevent scarring as far as possible.

Small-pox; Varioloid.—Varioloid, or *modified small-pox*, is merely a mild form of small-pox (*variola*), modified by occurring in one who has been partially protected by vaccination. Small-pox in any form is, fortunately, rare if vaccination is enforced. The differences between the symptoms of the modified and grave forms are those of degree only. Either form may be caught from a person suffering with the other. The disease is very contagious, and the contagious principle, which arises chiefly from the skin and from the lungs, permeates the air about the patient, and has, besides, a remarkable tenacity of life, since it may remain active for months in the clothing or in the scabs which have fallen. As a rule, one attack protects against a second, but instances of two or more attacks are quite numerous. The disease occurs oftenest in the cold season. In the unvaccinated it spares no period of life. It may even sometimes attack children before birth. The symptoms of the invasion consist, if well marked, of more or less headache, pain in the back,

high fever, drowsiness, vomiting, and sometimes convulsions. A red flush over the skin may be present. Sometimes, however, the initial symptoms are so mild that they are unnoticed. The eruption appears on the third day of the disease, or sometimes, in varioloid, on the first or second day. It first consists of spots which feel like shot under the skin, appear on any part of the body, grow more prominent by the time they are a day old, and on the next day—the fifth of the disease—become projecting, red, conical papules with a little clear, watery fluid at the apex. Very quickly the whole papule now becomes filled with clear fluid (vesicle). This is very unlike chicken-pox, in which there is never any shot-like sensation and in which the spots are full of fluid almost from the beginning. The vesicles of typical small-pox now go on to produce pus (pustules), but in varioloid many of the papules never form vesicles, while most of the vesicles which do form begin to dry up and produce crusts by the eighth or ninth day of the disease, without going through the pustular stage. Some of the vesicles, however, do pustulate, and not only produce scabs, but also leave marks afterward. The scabs begin to fall by about the fourteenth day. The fever and the other initial symptoms usually disappear when the rash comes out, but return in typical small-pox when the eruption becomes pustular. Contagion certainly lasts until every trace of scabbing has disappeared and thorough disinfection has been made, but the contagious power is so strong that it is best to quarantine the patient for eight weeks. Isolation and disinfection should be prompt and perfect, and everybody in the house should be re-vaccinated at once. The treatment must be left entirely to a physician.

Vaccinia; Cow-pox; Vaccination.—Vaccinia probably is small-pox occurring in cattle, but so modified by this fact that when introduced by "vaccination" into the human body it produces only a single sore, although it protects the whole system from a general attack. The fact that small-pox made such frightful ravages before vaccination was known, yet is comparatively uncommon now if vaccination is diligently practised, is positive proof of the value and the great importance of the procedure for every child. The supposed dangers of transmitting other diseases by vaccinating with human lymph are largely imaginary, and with the calf (bovine) lymph they no longer exist. The danger of erysipelas, lock-jaw, or blood-poisoning setting in is no greater from this sore than from a scratch or sore of any other nature. Physicians vary in opinion regarding the best age for vaccination. My own preference is for that of from three to six months, provided the child has no eruption of the skin and is in good health in other respects, there is no alteration of the diet going on, and the weather is not very hot. Girl babies should certainly not have it done on any part of the arm where the scar will show in later years. The thigh or the leg is a very desirable place.

After vaccination nothing is seen until the second or third day, when a red papule appears, which grows larger, and by the fifth or sixth day after vaccination tion has become a vesicle filled with a watery fluid. This increases in size until the eighth day, when it is about as large as a ten-cent piece. By the tenth day the vesicle has become a pustule, with its contents yellowish and cloudy, and with a broad red ring two to three inches in diameter surrounding it. By the eleventh or twelfth day the redness lessens and the fluid begins to dry; by the fourteenth day the scab is pretty well formed; and by the end of three weeks or thereabouts this falls off—if,

indeed, the child has not rubbed it off before—and leaves a scar which finally becomes white and pitted. Generally there is slight fever by the fourth or fifth day after vaccination, and this increases and is at its height by the ninth or tenth day. At this time there may be restlessness and irritability, with considerable swelling and pain of the arm or leg. Sometimes a child seems quite ill. After the vesicle begins to form it should be guarded against injury by covering it with a vaccination shield, or by a pad of salicylated absorbent cotton held in place with adhesive plaster or a roller bandage. Often the physician prefers to apply the cotton or the shield immediately after vaccination, in order to guard against any possible danger of blood-poisoning. If the vaccination does not "take," it must be repeated until it does. It is only very rarely that the effort will not at last succeed.

Most children who have been successfully vaccinated will never develop small-pox, but in others the protection ceases to a certain degree after a number of years, and they may contract varioloid. Absolute protection may be counted as lasting about five or six years. A child should therefore be re-vaccinated at the age of six years, and again at that of twelve years. When small-pox is prevalent every one in the house should be vaccinated who has not had it done successfully within a few years.

Erysipelas.—This disease may attack any age, is commonest in early spring, and is contagious to a limited extent only. It develops usually about a wound, even though it be a very small one; consequently in early infancy it is generally seen about the navel or after circumcision. When not about a wound, it occurs oftenest on the face. The contagious principle probably emanates from the skin, and may adhere to furniture or to clothing, and be carried by another person from the sick to the well. One

attack does not protect in the slightest from others. The disease begins with fever, languor or restlessness, delirium or stupor, and pain in the part involved. These symptoms are often preceded by a convulsion or, in older children, a chill. The eruption appears in a few hours. The skin of the affected part of the body becomes shiny and as evenly bright red as though red ink had been spilled on it. The color disappears upon pressure, but returns rapidly. Sometimes small blisters form. The tissues beneath the surface become much swollen. The inflammation, pain, and fever continue for two or three days, and after four or five days the attack is over, at least in the original area. Unfortunately, the eruption tends to spread in different directions, and the disease may thus last indefinitely. Desquamation in small or large scales occurs.

Erysipelas is usually very fatal in children one or two weeks old, and severe at all times in infancy. A child sick with it should be separated, especially from any one who has even a slight abrasion of the skin. A new-born baby with the disease must be at once removed from its mother for the sake of the latter, for erysipelas in a woman after confinement is very dangerous. Quarantine should certainly last as long as there is any scaling. Probably two weeks from the onset of the disease would be an average figure for cases in which the eruption had not spread from the original spot.

Diphtheria.—A very common, contagious, and dangerous disease, attacking any age, although rare in early infancy, and somewhat more frequent in damp and cold weather. The contagious principle is contained especially in the secretion from the nose and throat. It may stick to clothing or other objects, retain its poisonous

properties for months, and be carried from the sick to the well. The inhalation of sewer-gas was formerly supposed to cause the disease. This can be true only in so far as the breathing of the gas, like the living under any other unhygienic condition, may debilitate the system and irritate the throat, thus rendering the child more susceptible to the action of the diphtheritic germs. One attack in no way protects from subsequent ones. The disease begins with feverishness, loss of appetite, debility, heaviness, and sore throat. Examination of the throat at this stage may show the tonsils swollen and, perhaps, exhibiting a few dotted white points as in ordinary tonsillitis, but nothing characteristic. In a few hours or by the next day there has developed, except in the mildest cases, a white opaque membrane covering one or both tonsils and extending to other parts of the throat. The child continues feeble and feverish; the membrane spreads; the glands below the jaw on each side are generally swollen; and there is liable to be a running from the nose, due to the extension of the disease to it.

In very many cases the membrane develops first in the nose, and may not spread beyond it. These cases are easily overlooked and are a source of great danger to other children.

In average cases which recover the patches begin to disappear after a week, and are entirely gone after ten to fourteen days. The symptoms meanwhile have slowly ceased, except the very decided and characteristic weakness, which persists for a long time. In unfavorable cases the membrane continues to form and the child finally dies of exhaustion.

The membrane very often spreads to the larynx and produces *laryngeal diphtheria*—that is, *membranous croup*. This very dangerous condition is apt to come on between

the third and sixth days of the disease. Sometimes, however, the membrane attacks the larynx first or solely. Nearly every case of membranous croup is in reality laryngeal diphtheria. Although there are occasional instances in which the membrane in the larynx is not diphtheritic, the diagnosis of such an occurrence cannot ordinarily be made with certainty. The first symptom of membranous croup is hoarseness, which is soon followed by labored and noisy breathing and the peculiar croupy cough. Unlike spasmodic croup, the obstruction to breathing is persistent. The child sits up in bed laboring for breath, looks pale and bluish, and will die painfully of suffocation in a few hours or days if relief cannot be had.

The danger of paralysis following diphtheria has already been alluded to (p. 292). It comes on oftenest during convalescence, between the third and fifth weeks.

With regard to the treatment of diphtheria, any child who shows even a small whitish spot in the throat should be isolated promptly and be visited by the family physician. It may be nothing of consequence, but it may be the beginning of diphtheria, and isolation may keep the disease from spreading to others. Should the physician order applications to the throat, his instructions must be carried out implicitly, no matter how cruel they seem. Whoever paints the throat must take particular care that none of the membrane is coughed into his or her nose, eyes, or mouth. The remarkable reduction of strength which attends and follows the disease must never be forgotten. Death from sudden heart failure has not unfrequently occurred after all symptoms had disappeared. Consequently, no child suffering from or convalescent from diphtheria should be allowed to get out of bed, or even to sit up of itself, until the physi-

cian in charge permits; and, if it must be taken up, it should be lifted very slowly and carefully. All the precautions for isolation and disinfection must be followed exactly. All cloths used for the reception of membrane or of saliva should be burned at once. If there is any difficulty in breathing caused by diphtheria of the larynx, the air of the room may be moistened, as well as disinfected, by a disinfectant vapor (Appendix, 103). Quarantine should continue until examination of the secretion of the nose and throat by a bacteriologist shows that the germs of the disease are no longer present. When it is not possible to have this examination made, quarantine should continue for two weeks, or, in bad cases, three weeks, after all trace of membrane has disappeared. In cases of laryngeal diphtheria parents should not hesitate to give permission for any operation which the physician in charge may advise. Prompt consent may mean the saving of life, and certainly generally gives temporary relief at the least.

Whooping-cough; Pertussis.—A very prevalent contagious disease of children; oftenest seen under the age of five years, and very common in the first year. It is frequent at all seasons of the year. It is more serious than is ordinarily supposed, and an appalling number of children die from its effects, usually as the result of some complication, especially pneumonia, tuberculosis, convulsions, or affections of the bowels. The contagious principle seems to reside in the expectoration and the breath, and probably is active during the whole attack. It usually requires close proximity to communicate it. The carrying of the contagion by a third person is certainly very unusual. A second attack occurs with even greater rarity than is the case in measles and scarlatina. The

disease may be severe, or so light that the child is hardly incommoded by it. The younger the child the more dangerous is the disease likely to be. The attack begins with slight cold in the head and a troublesome cough which is worse at night and not relieved by the ordinary treatment for bronchitis. In a very few days the cough occurs in longer paroxysms, during which the child becomes red in the face and seems hardly able to get its breath, and after which it may vomit. After this *stage of invasion*, which averages two weeks, but which is very variable and may last for only a few days, the *whooping* or *paroxysmal stage* begins. The paroxysms, or "kinks," as they are often called, are now longer and more intense. The child gives a long series of rapidly-repeated short coughs without drawing breath, and continues this until it is nearly blue. At last it makes a long-drawn inspiration with a peculiar loud crowing sound—the well-known *whoop*. Very often the whole process is repeated immediately, and perhaps again and again. The paroxysms are frequently so severe that they are followed by vomiting, and the child may lose flesh and strength from its inability to retain food. A large amount of stringy mucus flows from the mouth after the attacks, and may be accompanied by blood. The paroxysms are most frequent at night. In a mild case there are only five or six in twenty-four hours, but in a severe one there are forty or fifty or more. In the mildest cases it sometimes happens that no whooping occurs at any time; still, the peculiar paroxysmal character of the cough often makes the nature of the disease plain.

The intensity of the attack remains the same for from three to six weeks in cases of average severity, and then the *stage of decline* begins. The duration of this is very

indefinite. The paroxysms become less frequent and the cough much looser, and little by little the whooping disappears, until it ceases by six or eight or more weeks from the first onset of cough, and only a bronchitis is left, which lasts an indefinite time. When the attack occurs in the autumn the bronchitis is very obstinate, and may continue with occasional whooping throughout the winter.

Just how long the disease is contagious is uncertain. We are safe in saying that it averages at least six or eight weeks from the beginning of the attack. It probably grows less contagious as time passes. If the whoop has once distinctly stopped and there has been a period of some days without it, we may call the disease over, even although the whooping should begin again later. The second whooping is a sort of *habit* left by the disease, and children have been known to have it even a year after the attack was over. It cannot properly be considered a part of the infectious disease.

Treatment should be ordered by a physician in every case, not only on account of the discomfort which attends the attack, but also because of the danger of complications. Although the disease can only occasionally be cut short, it can usually be relieved very decidedly. If one plan of treatment does not answer, another probably will. The child should have an abundance of fresh air, be warmly clad, and not be exposed to draughts. Sleeping in a room which has been well aired and not occupied all day will often prevent many paroxysms at night. During the paroxysm the child's head should be supported by the hand. In very bad cases, in which the child becomes almost or quite unconscious and ceases to breathe, it should be slapped in the face with a cold wet towel. Fortunately, these cases are not very common. Later in the disease a change of air will sometimes do wonders.

Mumps.—A painful but not dangerous inflammation of the salivary glands, which are situated in front of, below, and behind the ears and below the jaw. It is commonest in the cold season, and seldom attacks very young infants. It is distinctly contagious, even during incubation. Close contact is usually required to contract it, although instances of its having been carried are known. One attack usually protects from subsequent ones. The disease begins with dulness, more or less fever, and pain and stiffness about the jaws, usually on one side. A swelling, situated below and slightly behind the ear, rapidly develops, and becomes very marked within forty-eight hours. There is much tenderness on pressure, chewing is sometimes impossible, talking and swallowing are difficult, and in some cases the mouth can scarcely be opened. After a day or two the other side of the face generally becomes affected in the same way. The whole attack lasts about a week. Treatment consists in rest in bed and the administration of a laxative and a fever mixture (Appendix, 108). Food should be soft. A wad of cotton covered on the outside with oil silk may be fastened over the inflamed region. Hot fomentations or poultices may be applied if the pain is very great. Quite rarely the disease becomes dangerous from complications. The duration of contagiousness is uncertain, but isolation should last ten days or two weeks after the symptoms have disappeared.

Influenza; Grippe.—An infectious disease prevailing in widespread epidemics, especially in winter and spring, and attacking all ages. One attack in no way protects from a later one. Little is known about the duration of incubation or the length of time during which the patient is capable of infecting others. The contagious principle

is probably contained in the secretion of the respiratory apparatus. It is a mistake to characterize every severe cold with some fever as "grippe." The symptoms of the disease begin suddenly and are characteristic, although they vary greatly. Cases may be mild or very severe. We may find the respiratory symptoms most marked, as coryza and cough. Other cases show digestive disturbances especially, as vomiting and diarrhœa. In still others nervous symptoms of some sort are the most prominent, such as intense aching in the head and body, or delirium, dulness, or other suggestions of meningitis. But whether or not any of the symptoms mentioned be present—and they are often absent, especially in infants and young children—there are the characteristic presence of a degree of prostration out of all proportion to the apparent cause for it, and a continuance of fever, not usually high, to account for which there is nothing discoverable. This prostration is liable to be especially great in infants.

Mild cases of grippe last three or four days. Severe ones may also be short, or may be prolonged for a couple of weeks. Complications are very frequent, those in children being especially pneumonia, bronchitis, tuberculosis, inflammation of the glands of the neck, inflammation of the ears, and severe diarrhœa. After every case of grippe there is liable to be unusually prolonged debility. Relapses, too, easily take place. For all these reasons a mother should not undertake the treatment of a case among her children, except in the line of putting the patient to bed and preventing the spread of the disease. It is often impossible to do the latter, but the attempt should be made, especially when there are infants in the household. The isolation should continue until the attack is thoroughly over.

(6) MISCELLANEOUS DISORDERS AND HABITS.

Premature Infants.—A child may be born in the seventh or eighth month of pregnancy, or even earlier, long before it is quite ready to live outside of the mother's body, and when it weighs not more, perhaps, than two and a half or three pounds. We need not necessarily despair of the life of a baby, however unpromising it seems at first. Children born at six and a half calendar months have in very rare instances lived. But even at the age of seven months the vitality of the premature infant is low, and great care is required to maintain life. The great needs are nourishment and heat. The maternity hospitals employ an apparatus, called a *couveuse*, *brooder*, or *incubator*, especially devised to supply the latter (Fig. 87). For family use a couveuse may be bought at the instrument-makers, or hired from some of them. This is perhaps better, as the apparatus is costly. But with an increased degree of attention it may be entirely done without fairly well. If a premature baby is bathed at

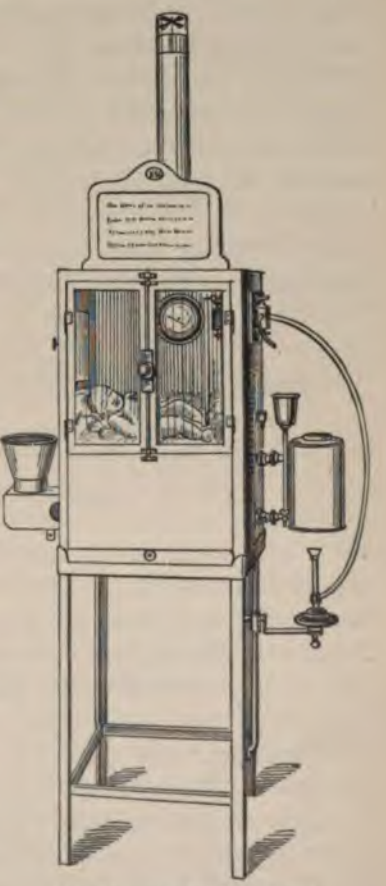


FIG. 87.—"Ideal" incubator.

all immediately after birth, the temperature of the water should be 102° F., and the greatest care should be taken while drying to see that the child is not chilled. It should be kept very warm by swaddling it in raw cotton, head and all, leaving only the face exposed, wrapping it about with a blanket, and tying it around with a roller bandage. Hot bottles should be placed on each side of it as it lies thus wrapped up in the bed, and fresh ones be substituted frequently. A very convenient method is to place the child in a baby's bath-tub half full of raw cotton in which numerous hot bottles have been concealed, not near enough to the child to run any risk of burning it. The child wears no clothing at all except

FIG. 88.—Apparatus for feeding weakly infants.

the cotton about it. A diaper or an extra layer of absorbent cotton may be placed under its seat. The room should be kept warm, and especially so when this human bundle is unwrapped for its bath. After bathing it should be rubbed with sweet oil and be rolled up again in fresh cotton. Often it is better to omit all bathing, and simply to rub with the oil. Nourishment must be given every hour in small quantities. If the child is too weak to suck, as is usually the case, it should be fed from a spoon or a medicine-dropper, or, better still, with such an apparatus as is shown in the illustration (Fig. 88). This can be readily made by any druggist. Sometimes it is necessary to nourish it through a long elastic tube passed through the mouth into the stomach (gavage).

Rickets.—A disease characterized by impairment of the general health, and especially by imperfect development of the bones. It is commonest between the ages of six months and three years. Among the probable causes are insufficient clothing, damp or ill-ventilated dwellings, a lack of outdoor air, and inherited weakness of constitution; but the chief cause appears to be some defect in the character of the food. Babies fed on healthy breast-milk are not liable to develop rickets, but we must be sure that the milk is actually healthy. Thus, for instance, too long deferring of weaning may cause the disease by rendering the milk of insufficient strength. Babies fed on condensed milk are exceedingly prone to develop it, however well the food has seemed to agree. Children are very likely to become rickety who have constantly suffered from disturbances of the stomach and bowels, the result of an unsuitable diet.

The first symptoms in well-marked cases are free perspiration about the head while the child is asleep, restlessness, tossing off of the bed-clothes, distention of the abdomen with gas, and sometimes a disposition to cry when picked up, the last being due to tenderness about the ribs. These early symptoms are very important, inasmuch as prompt treatment may arrest the disease before it advances further. A little later there will be decided enlargement of the joints, especially of the wrists and of the junctions of the ribs with the cartilages in front. The latter produces a row of little prominences running from above downward outside the nipple on each side of the chest. This is often called the "rickety rosary," from its resemblance to a string of large beads. It can be felt, and in severe cases seen as well. The head is enlarged and square, with a projecting forehead and flat sides and top. The fontanelle remains open, and by the

age of a year or over may be even larger than at birth. The teeth are late in appearing, and there may be none at the age of one year. They often decay very early. The muscles are weak and the bones soft, and as a result deformities are produced. Bow-legs or knock-knees often develop, and the chest acquires in its transverse circumference a peculiar violin-shape with the smaller end in front, a groove on each side running longitudinally from top to bottom, and a decided prominence of the breast-bone. With this is combined very often a marked enlargement of the abdomen. Lateral curvature of the spine in young children is usually due to rickets. The long posterior curvature has already been alluded to (p. 305). The accompanying illustration of a mild case of rickets (Pl. IV.) shows the enlarged abdomen and wrists, and to some extent the narrowing of the chest.

Children with rickets are often fat, and we should therefore have no false sense of security because there has been no loss of weight. They are also peculiarly liable to suffer from colds in the chest, convulsions, and catarrh of the bowels.

The principal treatment of rickets is preventive. Plenty of the best nourishment, a life largely in the open air and sunlight, daily immersion in the bath, and prompt attention to any disturbance of the stomach and bowels will usually avoid any danger. If symptoms appear, there is something hygienically wrong, which must be searched out. The food must be made even more nutritious, yet digestible. Raw-beef juice is often useful. A change of air, especially to the sea-shore, may do much toward the recovering of the lost health. Cod-liver oil and daily salt baths (Appendix, 49) are the best remedies. All attempts of the child to stand should be discouraged, as

PLATE IV.

Child with well-developed rickets suffering also from chicken-pox, showing the contracted chest, swollen abdomen, and enlarged wrists of the first disease, and the characteristic rash of the second. (From a photograph.)

bending of the legs is liable to follow. It is hardly necessary to say that the treatment of a disease as serious as this must be guided by a physician.

Scrofula.—The term *scrofula* is seldom used now in the sense in which it was formerly, to designate a distinct, independent disease. Most of the different ailments once called by this name are in reality only manifestations of tuberculosis in different parts of the body. It is a mistake to call the delicate, flabby children with enlarged glands and sore eyes "scrofulous." Some of them are tubercular, some syphilitic, and some owe their ailments to other causes. The term, if used at all, should be applied only to tubercular inflammation of the glands of the neck, or, perhaps, more widely to children who have a tendency, possibly inherited, to develop tubercular affections. But even this use is questionable, and, owing to the confusion which exists about the proper employment of the word, it would be better to abandon it altogether.

Rheumatism.—The disease may show itself as a severe acute inflammation of many of the joints of the body, with high fever and extreme pain on the slightest movement; as a slighter and more chronic inflammation of only one or a few joints, which become more or less red, tender, and swollen; as a stiffness and soreness of some of the muscles; or, finally, in some other more unusual way, as in the heart or the nervous system. It is much more frequent in children than is commonly supposed, but is very uncommon in infants. Most of the attacks of persistent pain in the legs in infants under two years of age are dependent on scurvy. Even the mildest form of articular rheumatism may be followed by St. Vitus' dance or by heart disease. The latter is more liable to follow rheumatism in children than in adults. It is, indeed, at

times the first and the only symptom of the rheumatic state, and there may be no articular pain at all. In older children the pains in the joints, which are often called "growing pains" or are attributed to sprains, and looked upon as matters of no consequence, may really be due to rheumatism or to hip-joint disease. The diagnosis is so important that medical advice is recommended in all doubtful cases, and certainly in those which are clearly rheumatic.

A child with even a slight attack of rheumatism of the joints is better kept at rest in bed, in order to ward off a rheumatic inflammation of the heart by throwing as little work on that organ as possible. The food should be light and easily digestible, and meat should be avoided to a great extent or entirely. All exposure to chill must be prevented, and the inflamed parts should be wrapped in cotton-wool or flannel.

Scurvy.—In infants this disease often simulates certain others very closely, particularly rheumatism and paralysis. The patient, usually an infant of from six to eighteen months or less, suffers from pain in the extremities, particularly the legs, of so severe a nature that the child cries out if they are handled, and will not voluntarily move them at all. With this in bad cases are associated a dropsical condition of the limbs, and often general pallor. The gums frequently become swollen and purple and bleed easily. This symptom is very characteristic when present. The cause is always something wrong with the food given. Most often it occurs in children who are using some one of the commercial patented foods. The treatment consists in correcting the fault in the diet, and in giving fresh fruit juice of a nature suited to the age of the patient.

Enlarged Glands; Adenitis.—The glands in the neck or elsewhere may inflame, and can then be felt as larger or smaller movable and somewhat tender lumps below the skin. If the inflammation in them is intense, they grow larger still, become red and soft and filled with pus, and finally burst. When they show a tendency to persist, to increase in size and number, and, it may be, slowly to suppurate, one after another, the suspicion arises that tuberculosis is the cause. The suddenly developing inflammations are generally due to an acute irritation somewhere, not of a tubercular nature. For instance, enlargement of the glands below the jaw is often the result of inflammation in the mouth or throat, and occurs in diphtheria and scarlatina because these parts are affected. Enlarged glands at the back of the neck follow irritation of the scalp by eczema or other cause; those below and behind the ear result from irritation of the ears or swelling of the tonsils, or frequently accompany measles and German measles; those in the armpit may be the result of some sore upon the hand, chest, or arm; and those in the groin may follow a similar condition of the lower extremity. Usually the swellings disappear very soon after the cause is removed. The disappearance may be aided by rubbing them gently twice a day with soap liniment. Sometimes, however, the swelling is very obstinate, or may go on rapidly to form an abscess. As a rule, only one gland is involved in such cases. In any case where the swelling does not disappear promptly a physician should be consulted, as the trouble may be of a serious nature.

Heart Disease.—The recognition of disease of the heart in children is usually impossible by the mother. Severe cases exhibit great shortness of breath, making the

child unable to lie down, very forcible pulsation over the region of the heart, a livid tint of the skin, especially of the lips and fingers, and a dropsical condition of the body, especially of the feet. It is the milder cases, however, which are so often overlooked until it is too late for the physician to be of any great service. Such a child is apt to be decidedly paler and more delicate than there seems any reason for, and especially to have some *shortness of breath on exertion.* This is chiefly evident in the fact that the child is indisposed, for some reason not known to himself, to take much physical exercise. If a boy, he finds that he cannot run as fast or as far as other boys, and consequently chooses the quiet games favored by girls. He is indisposed to climb the stairs, and, in fact, seems inactive without being ill. In some cases there may be a tendency to faintness at times, or a slight cough, palpitation, pain over the heart, or disturbance of digestion; but these are very inconstant symptoms. All symptoms may disappear when the child is in the best general condition, and reappear only if he is complaining in some other way.

The importance of an early recognition of the disease is enormous. No mother wishes to be unduly anxious about her child. At the same time, the *persistence* of such vague symptoms as described, and especially of the evidence of shortness of breath, should lead her to have an examination of the child's heart made by a physician in order to begin treatment at once, in case any evidences of disease are found by him.

Marasmus.—This term, as commonly used, does not indicate any distinct disease, but rather a progressive wasting or "fading away" of the body. The child be-
ies excessively thin, is pale and often sallow, its face

is wrinkled, and its flesh hangs on its bones. Viewed in the widest sense the causes are various, among them being tuberculosis, syphilis, chronic vomiting, persistent although slight diarrhœa, and food which is inadequate in quality or quantity. In nearly every case a physician can discover the cause, and often can remedy it.

Inflammation of the Breasts.—In both boy and girl babies in the second week of life the breasts are very apt to swell, to become tender, and to secrete a milk-like fluid. If they are let alone, the trouble disappears in one or two weeks. If the swelling is very decided and the breasts are red, wet dressings will be of service, but the physician in attendance must take charge in such cases. Some ignorant nurses have the habit of squeezing the breasts of newborn children in order to empty them well, or, in case of girl babies, to favor a good development later in life. Such a procedure is unnecessary and harmful in the extreme, and may readily produce an abscess.

Hiccough.—Although seldom of any serious importance, this may be very annoying. It consists of a spasmodic contraction of the diaphragm. It is usually dependent upon some disturbance of digestion, but may be due to many other causes. In babies it may often be relieved by a rapid change of position, patting the back, or by giving a little hot water, perhaps with soda mint (Appendix, 105). In the case of older children the drinking of a glass of water, the holding the breath as long as possible, or causing the child to laugh is often effective.

Fever.—Fever is, of course, only a symptom of a large number of affections. As it often develops sud-

denly and without other symptoms, a mother should know some simple plan of treatment which may do good and cannot work harm, and which she may employ before the physician arrives. First of all, the clinical thermometer should always be used (see p. 43) to determine whether or not there really is fever. A moist skin and cool hands are not always a sign of the absence of fever, any more than hot head or hands are a positive sign of its presence. A feverish child has usually little appetite or power of digestion, and food should be withheld or be of the lightest kind. Milk is the best thing under most circumstances, or some such article as milk-toast, junket, arrowroot, or light broth. If food is vomited, the child should have no nourishment at all. A good laxative, such as a full dose of magnesia or castor oil, is always admissible, and a fever mixture (Appendix, 108) may be given. Confinement to bed is desirable. Other children should be kept away, both for the sake of quiet and to avoid danger of contagion should an infectious disease be beginning. A warm mustard bath (Appendix, 41, 46) is often given to "bring out the rash" at the beginning of or later in eruptive fevers. We must understand that the so-called "striking in" of the rash in many bad cases of eruptive fevers is not the thing which is doing harm. The rash merely disappears because the heart is dangerously feeble, and in that case returns again because the mustard bath has stimulated the circulation. The warm bath is excellent also for producing perspiration and reducing fever. If after two or three hours the temperature has not been reduced, the extra wrappings used may be removed and the coverings made as light as is comfortable to the patient. The abnormal heat of the skin makes less thickness of coverings required than in health. The child may have water to

drink, cool but not iced, freely in any reasonable quantity. Mothers err greatly in refusing to give a thirsty child water. Bathing of the head with bay rum or cologne is always permissible if it does not produce chilliness. A cold wet cloth may be laid on the head if headache is severe.

Dropsy.—An accumulation of fluid in any part of the body. The condition may be limited to one part, or may be general and affect the whole surface of the body. The most frequent causes are disease of the heart and Bright's disease. In the last stages of chronic, very debilitating diseases, dropsy of the feet and hands shows that the end is approaching. Peritonitis and disease of the liver may produce dropsy of the abdominal cavity. Treatment can be conducted only by a physician.

Cold Hands and Feet.—This condition is usually a sign of imperfect circulation, itself depending upon indigestion, general poor health, insufficient clothing, lack of exercise, and similar causes. It not infrequently develops shortly after the baby begins to wear stockings and shoes, before it has became accustomed to them. The stockings should be warm and loose, and the shoes large. The warmth of the clothing of the whole body ought to be increased, and all other possible causes removed. Sponging the hands and feet with cold water and following this by brisk friction is often a valuable plan, or they may be rubbed daily with turpentine, perhaps mixed with an equal part of sweet oil. As children cannot sleep well if the hands and feet are cold at night, a hot-water bottle or bag must be placed in the bed if other plans do not suffice. Feeble infants should have mittens or stockings drawn over their hands, if cold.

Retention of Urine.—No urine may be passed for twenty-four or even more hours after birth, and yet nothing serious be amiss. If a warm bath or a poultice over the bladder does not relieve the difficulty, the advice of a physician ought to be asked promptly, as there may be some physical obstruction. Sometimes the pain which passing water causes induces a child to retain the urine as long as possible. Sometimes, too, after a severe attack of colic a child is unable to pass water for perhaps twelve hours, and suffers considerable pain as a result, as shown by the straining cry and the frequent doubling of the legs upon the abdomen. A bath or a poultice will probably produce a passage of urine. There is apt to be but little urine passed at the beginning of fever or during severe diarrhœa. Such a condition is a matter of no consequence, so far, at least, as the urinary symptoms are concerned. In acute Bright's disease the urine is often smoky in appearance or of a muddy-brown color and very scanty. This condition is a very serious one. It develops most frequently during or after scarlet fever. A hot poultice should be applied over the kidneys—that is, just below the last ribs on each side of the spine—and a doctor must be summoned at once.

Bed-wetting; Incontinence of Urine.—The habit of wetting the bed at night or the clothes by day is a *dis ease*, and not a bad habit merely, and it is an unwarrantable cruelty to punish a child for it. There are cases in which threats or punishment may avail, but these are so rare that they may be ignored for all practical purposes. The causes are various, and the advice of a physician is always required, for the matter is sometimes serious and is always annoying. The only treatment open to the mother is to see that the child has a light

supper, is made to pass its urine just before going to bed, drinks no fluids for some hours before bedtime, is taken up frequently during the night to empty its bladder, sleeps on the side and not on the back, and is not too warmly covered. To prevent sleeping on the back an empty spool may be tied at the middle of the spine by a tape going around the waist.

Pain on Passing Urine.—It may happen that a baby in apparently perfect health often suddenly begins to cry bitterly without any discoverable cause, continues this for a short time, and then ceases. There are no other symptoms, but further study shows that the crying occurs only when the urine is passed. The natural conclusion is that the passage is painful, and an examination of the parts should be made. If nothing can be found wrong anatomically, it is probable that the urine is unusually irritating. In such cases an examination of the diaper may show a reddish or yellowish deposit which, when dry, can be rubbed between the fingers, and which feels like the very finest gravel—as, indeed, it is.

Phimosis.—This term denotes the existence of a long and very narrow fore-skin in boy babies, which cannot be retracted so as to expose completely the part beneath. It always demands examination by a physician, since the retention of the cheesy secretion beneath it is liable to make trouble if the condition is neglected. Sometimes circumcision is required, but usually less radical treatment is sufficient. Occasionally a somewhat analogous condition is seen in girl infants.

Leucorrhœa.—A leucorrhœa which may be quite profuse is not at all of infrequent occurrence in little girls

even in infancy. The knowledge of this fact may save a great deal of unnecessary anxiety. The disease sometimes comes from direct injury received, for instance, from a fall on a sharp object, or in other ways, but much oftener is the evidence of debility. It is occasionally produced by thread-worms which have found their way into the passage from the bowel. Not infrequently it is a much more serious matter and is distinctly contagious. Treatment consists in great cleanliness, the washing with and the injecting of a solution of boric acid (Appendix, 79), and, in case there is a great deal of external irritation, the application of a boric-acid-and-zinc ointment (Appendix, 75) upon a piece of lint folded and laid between the irritated surfaces. In any obstinate case—and the disease is very apt to prove so—a physician must be consulted.

The Blue Baby; Congenital Heart Disease.—It sometimes happens that a new-born baby has a bluish tinge, showing that the blood does not circulate properly or get enough oxygen. This is not infrequent in weakly babies who may, in the first few days after birth, have had difficulty in getting the circulation established. Should, however, the color persist, the heart is probably diseased. In mild cases the blue tinge appears only when the baby cries, but if the disease is severe the color is more or less constant and death may take place in a few days or months. In those who live to older childhood, or even to grow up, there is apt to be shortness of breath, palpitation, and a tendency to the bluish tinge either instantly present or coming on with exertion or with slight cold in the chest.

ng; Mouth-breathing.—These symptoms may be

due to overgrown tonsillar tissue, as already mentioned (p. 270), or to obstruction to breathing through the nose from some other cause. An examination of the throat and nose should be made by a physician in every case, since it is important to remedy the difficulty as soon as possible. Children who have long been mouth-breathers from nasal obstruction often acquire a characteristic expression of face and an impairment of bodily and mental development (Chap. XI., p. 270). Snoring in infancy is not often merely a habit ; but should examination by a physician show clearly that it is so, and that there is absolutely no obstruction, the infant's mouth may be gently closed whenever it is found open during sleep. A bandage may be placed under the chin and over the top of the head, and this will serve the purpose even better.

Thumb-sucking.—A great deal has been written about the dangers of thumb-sucking, yet the habit is an exceedingly frequent one, and few children seem to have suffered from it in the slightest degree. As there never is any advantage in the practice, it is best not to let it begin, and certainly not to allow it to advance. In the case of babies who have already contracted it, but who suck their thumbs only if not well, or as a means of quieting the nervous system when they want to go to sleep, there is no cause for worry. The habit will correct itself in good time or, if not, can generally be easily broken up. In some cases, however, the habit begins during the early weeks of life, soon becomes inveterate, and may persist for years or even into adult life, the child sucking its thumb nearly continuously, whether awake or asleep. A condition such as this demands active treatment, since there is danger of the jaw being permanently deformed.

The commonest deformity resulting is the V-shaped jaw, in which the middle of the upper jaw is pried forward by the pressure of the thumb against its edge, so that it assumes a too angular shape. The lower jaw is depressed, and the upper teeth grow forward like those of a rabbit, and sometimes even the nose is distorted by the upward pressure of the thumb upon the palate.

If it is noticed that the habit is being formed, the thumb should be gently removed from the mouth whenever found in it, and the child's attention directed to something else. If the habit has already been contracted, yet is not practised immoderately, it is questionable whether it is worth while to bother about it unless it tends to persist. If treatment is required, as in the persistent thumb-sucking described, bitter or disagreeable-tasting substances, such as infusion of quassia, extract of aloes, or asafœtida, may be put upon the thumbs. This is of no avail in bad cases, and the only method to be depended upon is that of forcibly keeping the thumbs out of the mouth. This may be done by making the sleeves of the night-dress extend considerably below the hands; or the child may have its hands put into little flannel bags or fastened to its sides at night—and during the day, too, if necessary. Persistence in this treatment for months is sometimes required.

Lip-sucking.—Occasionally infants develop the practise of sucking the lower lip. Although it does no particular harm, yet it is an ugly habit, which persistent interruption will probably break up without difficulty.

Dirt-eating.—It is not uncommon for children of two or three years to exhibit a fondness for eating earth, sand, plaster from the walls, and similar substances. Some-

times it is only a morbid habit depending upon a disordered nervous system. In other cases it appears to be connected with indigestion. Careful study may be needed to discover the cause. Constant supervision and interference, with appropriate treatment, will generally soon effect a cure. Sometimes, however, the practice is difficult to stop.

Biting the Finger-nails.—This is a common habit in children of two years and older, and one which often persists into adult life and ruins the shape of the fingers. It is generally merely the expression of an innate nervousness. Many children bite their nails only when excited, while others—the most inveterate cases—do it even when asleep. In its treatment the effort must be made to relieve the nervous excitability by suitable hygienic measures, although this is often a difficult matter. The practice may sometimes be broken up by dipping the fingers into a solution of some bitter substance, or, when this fails, by forcibly keeping them from the mouth, as in the case of thumb-sucking.

Defective Speech (Stammering, Stuttering, Lisping.—The terms *stammering* and *stuttering* are generally used interchangeably, although they are not identical in meaning. *Stammering* applies to the affection of speech in which the child is scarcely able to pronounce words at all. *Stuttering* is that in which the child makes sounds which it does not wish to make, such as the rapid repetition of a consonant at the beginning of a word, as "p-p-p-p-pig." For our purposes we may consider both affections under the title of *stammering*, and much that will be said applies to *lisping* as well. The habit is really a nervous disease, and might have been classified

accordingly. The persistent form is not common before the age of six years, is more frequent in boys than in girls, and is sometimes hereditary. At an age earlier than this it is more liable to be transitory, lasting a few weeks or months, and depending often on some temporary disturbance of the nervous system or of the health in general. The most important treatment is preventive, but the same methods apply to those who already have the habit. A child should be made from the beginning to talk slowly and deliberately and to pronounce all words very distinctly. In this way it will never find any words especially difficult. It must be carefully kept from association with stammering teachers, schoolmates, or friends, since its power of imitation is so remarkable. It must be maintained in the best of health, avoid nervous excitement, and never be allowed to talk when in a hurry. If there is the slightest tendency to stammer, the importance of slow and exact speech is all the greater. Scolding for the defect, or notice taken in a way to embarrass the child, will only make the trouble more pronounced. Exercises in breathing are very important, since the disease seems to depend in part on lack of control over respiration. The taking of deep breaths, holding them for a few seconds, and then letting them out slowly or with interruptions is very useful. This process may be repeated several times a day. A stammering child should take a full breath before beginning a sentence, and should have training of the voice systematically carried on. It should be practised in uttering the vowel sounds slowly and without hesitation, first in a whisper and then out loud, since the whispered voice is not apt to be stammered. The sounds may then be preceded by consonants. A single forcible expiration should be used to pronounce each syllable. The use of rhythm is a very great help.

Stammering is little likely to occur when syllables, words, and then sentences are pronounced in the slow, rhythmical way which one sometimes hears in schools when children recite in concert. Stammerers usually can sing without difficulty. Should a child begin a sentence improperly, it must invariably be made to stop at once and to repeat it slowly. This necessitates constant watchfulness, perseverance, and patience on the part of the mother, for recovery will probably be slow. There are institutions for the cure of stammering, and children who do not improve at home should be sent to some good one of this sort.

Holding the Breath; Spasm of the Larynx.—This, like the preceding, is a nervous disease rather than a habit. After great excitement, the act of swallowing, exposure to a draught of air, or a paroxysm of crying which is often the result of fright or anger a child may suddenly stop breathing until, in severe cases, it grows blue in the face and is nearly unconscious. A crowing inspiration sometimes attends the return of breathing. In other cases no occasion for the attack can be discovered. The affection is the result of a sudden spasmodic closing of the larynx dependent upon the great nervous excitement. It is generally not at all a serious matter, although in rare cases it may pass into general convulsions or terminate in death from suffocation. If the attacks are of frequent occurrence or severe, we should suspect that the child has rickets or some other constitutional disease. Sudden slapping of the face with a cold wet towel or the dashing of cold water into it from a glass is the best immediate treatment. The shock of this procedure makes breathing recommence. Medicines which are sedative to the nervous system may be needed.

Stooping; Round Shoulders.—The habit of stooping, with the consequent development of rounded shoulders, depends on various causes. Sometimes the character of the chairs used tends to produce it. In other cases the height of the table or desk from which the child studies is at fault. Not infrequently near-sightedness makes the child stoop to see better when reading or writing. A beginning disease of the spine may be the occasion. In very many cases it depends upon general debility. The treatment consists in removing the cause, and in continually checking the disposition to stoop. Shoulder-braces are sometimes employed. They do good more as a reminder than in any other way. Plenty of out-door active play, and such gymnastic exercises as strengthen the back and develop the chest, should be insisted upon.

Masturbation; Self-abuse.—The habit may be begun by small children, or even by infants, both boys and girls. Sometimes some local irritation is at fault, such as phimosis, worms in the bowel, inflammation of the vagina or abnormal adhesions there, and similar causes. In infants constant supervision must be given, the hands being forcibly restrained if need be. Especial watch should be kept over girl infants against the habit of "thigh friction," in which the infant irritates the genitals by rubbing them between the inner surface of the thighs. In older children the habit is sometimes the result of the influence of evil companions. In these cases remonstrance and judicious explanation may avail, and especially the constant but entirely unobtrusive watching of the child, who should be kept as much as possible in the compan- of the mother or nurse, and observed particularly while bed, at the water-closet, or in other places where usi

left alone. Great judgment is required to choose when to ignore and when to remonstrate. Medical advice should be had in bad cases, and an examination for local causes made.

(7) ACCIDENTS AND EMERGENCIES.

Cuts and Tears.—A *cut*, or *incised wound*, is made by some sharp cutting instrument. If deep or extensive, or if bleeding very freely, it should have surgical attention at once. A small cut which can be dressed at home

FIG. 89.—Roller bandage, showing the method of making the "reverses."

should be washed gently but thoroughly with absorbent cotton and cold or very hot water (which will both cleanse it and help to arrest the bleeding) and then with an antiseptic solution, such as a carbolic-acid lotion (Appendix, 81) or, still better, one of corrosive sublimate (Appendix, 82). A compress made of clean folded linen or muslin wet with the solution should now be placed over the wound and bound on, not too tightly, with a roller bandage. The dressing may be left on unchanged for days if it keeps perfectly sweet smelling and the child is not feverish or in pain. The illustration (Fig. 89) shows the different steps in the application of a roller bandage. The half turn, technically known as the *reverse*, makes the bandage lie smooth and close to the limb.

If the wound secr dressing must be

soaked in the antiseptic solution until it comes away easily and without pulling, the wound then washed with the solution, and a fresh dressing applied. This may have to be done daily if pus continues to appear. We must never forget that both the carbolic-acid and the corrosive-sublimate solutions are poisonous if swallowed. If the bleeding will not stop, the bandage must be applied with moderate firmness, or pressure be made with a finger, and a surgeon called in. If the blood spurts out of the wound in jets, an artery has been injured. Bleeding from this or from any other wound can always be stopped until the doctor arrives by making pressure with the fingers directly into the wound. The pressure must be constant, and not relaxed every few minutes to see if the flow has ceased. The use by others than physicians of what is called a *tourniquet*—such, for instance, as a twisted handkerchief or a cord tied tightly around the arm or the leg—is not only very painful, but is dangerous also, since it may cause serious injury of the tissues.

Should a child chance to have a finger cut off, this should be immediately washed carefully and fastened firmly in place again with adhesive plaster, and a physician sent for. It sometimes happens that the severed portion will grow fast.

A *tear*, or *lacerated wound*, is produced by some dull body, such as a stone or brick. It has ragged edges and does not often bleed much. Unless very small, a physician should treat it, since wounds of this sort are more likely to leave scars. A small tear must be cleansed carefully with lukewarm water followed by an antiseptic solution (Appendix, 79–82), as it is very apt to have dirt in it. The torn edges should be brought together as well as possible, and the wound covered with a com-

press wet with the antiseptic fluid and bandaged up loosely. The dressing must be renewed every day if it becomes soiled with pus, following the method just described for cuts. If it remains unsoiled, it may be left on until the wound is nearly healed. The small sore which remains may be dressed several times a day with a zinc-and-boric-acid ointment (Appendix, 75), spread on a small piece of lint. This ointment is also very useful for cases in which the skin has been partly scraped off—as, for instance, when the head or the knee has been scraped along the ground.

Punctured Wounds; Splinters.—Punctured wounds are those made by sharp-pointed objects, such as pins, needles, fish-hooks, tacks, splinters, and the like. They are often painful and attended by a good deal of swelling. The object must be removed and the injured part squeezed gently in warm water in order to favor the flow of blood, which will help to wash away the impurities which may have entered. If there is a tendency to swelling, a warm antiseptic poultice may be applied (Appendix, 66).

In case a needle has entered and remained in the flesh, great care should be taken not to break it in attempting to remove it, and it should be closely examined after removal to see that it is quite intact. If it has been broken, a surgeon must be called in and the fragment saved to show him.

Fish-hooks which have entered beyond the barb must either be cut out or be pushed through the skin from inside, but never torn out.

If any portion of a *splinter* is protruding, it may be seized with small pliers or tweezers and be pulled out, care being taken to avoid any side motion, lest the wood

break off. If it cannot be removed in this way, it may, perhaps, be picked out with a needle. Should a splinter too short to grasp have lodged beneath the finger-nail, the nail should be carefully scraped very thin over it and then be split open with the point of a sharp knife, just enough to allow of the top of the piece of wood being seized. This is not as difficult as it sounds, and generally causes but little pain. If efforts to remove a splinter fail and a physician cannot be had, the part should be poulticed until pus forms, when the splinter will probably come out with it.

Poisoned Wounds.—*Insect-stings* belong to the class called poisoned wounds. They are seldom dangerous, although for a time quite painful. Careful examination may show the sting of the insect still in the wound. It should be pulled out with tweezers, and water of ammonia or spirits of camphor applied. A cold-water dressing may then be employed to prevent swelling. The application of mud is as useful as it is old-fashioned.

Mosquito-bites are of this same class. They are often a source of great annoyance and disfigurement to children. The best procedure is to keep the little pests away by having screens fitted to the windows and doors, or a large canopy over the bed. A small canopy tends to shut out the air too much. The annoying itching may be allayed by touching the bites with carbolized oil (Appendix, 76), ammonia, or spirits of camphor, or with a cooling evaporating lotion (Appendix, 89). Dampened salt rubbed on the spot is sometimes useful.

Dog-bites or the bites of other animals, as the cat or rat, are sometimes productive of severe inflammation, and even of decided illness. It is rare, however, that hydrophobia follows. The dog which has bitten any one

should on no account be killed until it has been kept long enough to determine whether or not it was mad. To find that the animal was not rabid will be a great relief to all concerned. Wounds produced by the bite of an animal should be pressed out thoroughly under warm water or be well sucked. They may then be covered with a cold wet dressing. If the bite is that of a dog undoubtedly mad, the part must be cut out quickly or be cauterized deeply with a red-hot iron or with strong carbolic or some mineral acid, such as sulphuric or nitric.

Snake-bites constitute a variety of poisoned wounds fortunately not often met with in this part of the world. If the snake was a venomous one, a cord should at once be tied around the limb above the wound to stop the progress of the blood and to keep the poison out of the general circulation. The wound should be squeezed out under water, or may be sucked thoroughly, provided the lips of the person who does this are quite free from cracks. It ought then to be cut out or cauterized as in the case of dog-bites. Stimulants in large quantity have been recommended, and are perhaps of service. A solution of permanganate of potash of the strength of 20 grains to the ounce should be used to wash the wound.

Bruises.—Bruises, or contusions, generally do little damage other than temporarily to disfigure. A painful swelling develops, rapidly increases in size, and turns deep purple as the result of the escape of blood under the skin. This color gradually passes through different shades of green and yellow until the blood has been absorbed. To prevent the swelling and discoloration to any degree the treatment must be begun at once. Firm pressure may be kept up, or compresses wet with ice-water, very hot water, or alcohol and water continuously

applied. The colorless fluid extract of witch hazel put on at once on a compress is excellent treatment. A 25 per cent. ichthyol ointment is another popular application. If discoloration has occurred, its disappearance may be hastened by rubbing the bruise with lanolin.

Sprains.—A twisting or straining of a joint, or a *sprain*, produces great pain on motion, rapid swelling, and often a discoloration of the skin like that of a bruise. Although in many instances sprains are slight and are quite well in a few days, in some severe ones recovery is very slow and the bad effects are more lasting than in the case of broken bones. Every sprain except the very mildest should have a physician's attention as early as possible. If this cannot be procured, the joint should be soaked in hot water and then be put at absolute rest. If it is the ankle or the knee which is injured, the child must be kept in bed with the part elevated and covered with a dressing of cold water or of witch hazel. In the case of the arm the joint must be kept quiet on a pillow or supported on a splint or in a sling with the dressing applied. After the acute pain and all signs of inflammation have disappeared—which is often a matter of days or even of weeks—the joint may be rubbed daily with soap liniment or chloroform liniment and very carefully and slightly moved. A 25 per cent. ichthyol ointment is also a good application for sprains. Under the special supporting dressings which surgeons employ, the confinement to bed after sprains of the lower extremities is greatly curtailed.

Fractures and Dislocations.—In *dislocations* the bones which meet at a joint become separated from their nor-

mal relation—that is, they are "out of place." Dislocations are unusual in children, with the exception of that of the elbow-joint. In a *fracture* a bone is broken partially or entirely in two. Very frequently in children there is what is called a "green-stick fracture;" that is, there is a bending of the bone, not a complete breaking across. This is because a child's bones are much less brittle than those of an adult. Fractures and dislocations are painful, and generally produce decided deformity at the time. The child while being carried to the house or bed must be handled most carefully, and the part, especially if fractured, be always supported, since the slightest motion of the rough ends of the broken bone gives agonizing pain and tears the flesh about them. If the child has to be taken some distance, the limb should be bandaged with handkerchiefs or anything else at hand to an improvised splint, such as a piece of board or pasteboard, several newspapers folded so as to give as much stiffness as possible, or even a couple of small branches from a tree. In a similar way a broken leg can be bandaged to the sound one, or the arm to the side.

Burns and Scalds.—A *burn* is the result of contact with a flame or with dry heat of some sort, while a *scald* is produced by a hot fluid. For convenience we may call them both burns, for the injury to the tissues is the same in each except that the damage from hot liquids is generally less deep. The danger to life from a burn depends more upon its extent of surface than upon its depth. On the other hand, the degree of subsequent deformity depends upon the depth of the injury. If half of the surface of the body is involved, the result is nearly always fatal. In the more superficial burns the skin is reddened and perhaps blistered, while in the deeper ones

it is yellowish-white or blackened. The pain is usually very severe, yet in the worst cases the child may suffer very little, but be so alarmingly prostrated by the shock that it may die in a few hours. Only the small and slight burns may be treated by the mother. Pain must be first relieved by shutting away the air and preventing the rubbing of the clothes. To accomplish this several layers of soft linen cloth may be applied, wet with a strong solution of baking-soda—a heaping teaspoonful to a glass of water. As soon as the pain is allayed, or even from the first if not severe, the wound may be dressed with vaseline or oxide-of-zinc ointment; or, often still better, a boric-salicylic-acid lotion (Appendix, 80), or boric-acid ointment (Appendix, 74), as these make the wound aseptic. If a child's clothes are on fire its head should be placed low, for the flames naturally tend to rise, and burns about the head and hands are the most disfiguring. The child should instantly be thrown upon the floor and the burning clothes wrapped about with some thick woollen material, such as a piece of carpet, a rug, table-cover, dress-skirt, shawl, or overcoat, beginning always at the neck. Cotton and linen articles catch fire too easily themselves, but even these are better than nothing, for if quickly applied they may smother the flames before they are ignited by them. Nothing can be better than a tub or bucket of water dashed over the child, if this happens to be at hand. Running about the room or into the open air with the child only fans the fire. After the flames are extinguished stimulants should be given if there is much prostration, the child put to bed at once, and the clothing removed with the greatest gentleness if it is impossible to obtain a physician with reasonable promptness. Frequently the garments must be cut away bit by bit in order to avoid tearing the blis-

ters which have been produced. Only a small portion should be removed at a time, and the burnt part exposed dressed, letting the rest stay covered in order to reduce the pain from exposure as much as possible. The blisters may now be pierced at the edge with a clean needle, which has been sterilized by holding it a moment in the flame, and the burnt parts covered with soft linen cloths saturated with the boric-salicylic-acid lotion (Appendix, 80), or the boric-acid ointment (Appendix, 74). Lastly, the whole should be enveloped in raw cotton, oil silk, or paraffin paper, and bandaged loosely in order to exclude the air still more perfectly. Hot bottles should be applied to portions of the body which have not been burnt, if the prostration continues, and stimulants should be given. The after-treatment will be managed by the physician when he arrives.

Burns with acids should have the liquid washed away quickly with water or, still better, with a solution of baking-soda. *Burns with alkalies*, as lye, should be treated quickly with vinegar and water. Either sort may then be dressed with oily applications, such as olive oil, vaseline, or zinc ointment.

It must be remembered, however, that oily applications used on a burn of any kind usually add to the difficulty of making it aseptic when the doctor arrives, and that an antiseptic dressing, such as the boric-salicylic-acid lotion referred to, is to be preferred.

Sunburn.—The open-air life so greatly to be desired is liable to cause sunburn, which, if of slight extent, is a matter of little consequence. To be ruddy from the sun is much better than, from lack of fresh air and sunlight, to look like a potato-sprout in a dark cellar. Sunburn may, however, become so severe that it is actually painful and demands treatment. The skin in such a case

may not only be reddened and tender, but blistered and much swollen also. The simplest treatment consists in covering the injured parts with oxide-of-zinc ointment.

Freckles.—Deposits of pigment in the skin in the form of irregularly-shaped small blotches, usually resulting from exposure to the sun or glare. They are most marked in blondes, especially in those with red hair and a very transparent complexion. Brunettes may develop them also, but are more likely to have a uniform deposit of pigment; that is, they become *tanned*. Freckles are not common before the age of three years, and the tendency to develop them often diminishes after the age of puberty. Although keeping a little girl out of the sun may prevent freckles, it would certainly injure her health. The best plan to avoid them is to have the face shielded by a broad-brimmed hat and to shun the most intense glare. There are numerous applications recommended to remove them. Some of these are much too powerful to be used except under a physician's direction. This is also true of many of those sold in the shops. A preparation which may be tried safely is a benzoin or a borax-and-acetic-acid mixture (Appendix, 90, 91).

Frost-bite; Freezing.—The first effect of long exposure to cold is to make the skin, usually of the fingers, toes, nose, or ears, become numb, white, and wrinkled. Then, upon coming into a warm place, the parts become red, swollen, and itching. If the action of the cold has been severe, blisters form upon the frozen skin, and finally mortification may set in. Generally, under proper treatment, the frozen part regains its sensation and becomes painful for a time, the swelling disappears, and there is no further trouble. In the case of those who have

been nearly "frozen to death" the whole body is affected by the cold and there is unconsciousness. In the treatment of freezing, the child should be kept in a cool room for some hours and the frozen parts—or the whole body, if it is a case of general freezing—be rubbed with cold water or snow, or wrapped in cold wet cloths. A 25 per cent. ichthyol ointment may then be applied. The removal to a warm place should be made with the greatest care. Sometimes a frozen part may afterward be subject to chilblains.

Chilblains.—Red, smooth, shining spots of different sizes which itch and burn severely when the parts become warm. Sometimes blisters form, and even ulcers if there is much friction, as from a shoe. The favorite positions are the feet and hands, although the nose, cheeks, and ears are occasionally attacked. Chilblains are particularly painful when upon the feet, after they have become warm in bed. They are most apt to develop in weakly children, especially in girls with poor circulation, and are liable to recur every year with the autumn season and to last until warm weather returns. The original cause consists in sudden alteration of the bodily temperature—such, for instance, as follows rapid warming of the hands and feet at a fire after prolonged exposure to wet or cold. Treatment consists in improving the general health and in dressing the feet with broad, stout, easy shoes and with warm woollen stockings with garters going to the waist, or with warm mittens if the chilblains are on the hands. Frequent painting with Monsel's solution of iron or with tincture of iodine is often of great benefit.

Concussion of the Brain.—A serious disturbance of

the brain produced by a fall or a blow upon the head, and attended by complete or partial loss of consciousness lasting for a moment or for hours. The skin is pale and cold, and the pulse and respiration are feeble. The child may seem merely stunned, and there may be only vomiting and pallor and a bewildered condition. As even the mildest cases sometimes become serious later, every child who has exhibited any suspicious symptoms after an injury to the head should have medical advice as soon as possible. Meanwhile it should be put to bed in a darkened and very quiet room and be warmed by hot bottles if cold, but given no stimulants unless it is absolutely necessary. If it has severe pain in the head, but is not cold or weak, an ice-bag or ice-water compresses may be applied to prevent the development of inflammation.

Foreign Bodies in the Eye.—A cinder or other minute sharp particle often causes great irritation in the eye. If rubbing is prevented the tears will often wash the object away in a short time. If it adheres more firmly under the upper lid, the upper lashes should be seized with the fingers and the lid be pulled away from the eye and well down over the lower lid and then let go, when the lower lashes may sweep the offending body out. If this does not succeed promptly, the eye must be examined. Pulling down the lower lid reveals its lining and that of the lower half of the eyeball, but to examine the upper portions it is necessary to turn the upper lid inside out. The upper eyelashes must be dried and be seized between the finger and thumb, the mother standing behind the child. While the child is told to look well downward a blunt-pointed object, as a lead-pencil, is pressed against the middle of the upper eyelid and the lashes are pulled upward. It sometimes takes several trials to accomplish

Fig. 90).

The foreign body, if found, should be very gently removed with a moistened camel's-hair brush or pledget of wet absorbent cotton. Irritation may persist for some time, and a simple tepid eye lotion (Appendix, 85) may be dropped frequently into the hollow between the eye and the nose and allowed to trickle into the eye. If the brush fails to remove the object or if it cannot be found and the irritation continues, a physician should be consulted.

Lime or acid in the eye produces a great deal of pain.

FIG. 90.—Method of everting the upper eyelid.

The eye should at once have poured into and over it water containing, in the first case, a little vinegar or lemon-juice, a teaspoonful to a glass, and in the second case baking-soda, a tablespoonful to the glass. Sweet oil is also useful in either case. A physician should be consulted immediately.

Wounds of the Eye.—The eyeball may be cut by various sharp bodies, but the most serious wounds are those made by pointed instruments, such as scissors, forks, etc., which penetrate into its interior. Sometimes, too, some sharp foreign body, as a splinter of metal or of stone, flies against the eye and passes within it. The production of a misshapen pupil is proof that the wound is actually a penetrating one. The absence of this irregularity is, however, not an evidence of the contrary. A penetrating wound is always serious, as it may not only

cause the loss of the injured eye, but may even set up a sympathetic inflammation of the sound eye, and produce blindness in it also. Professional aid must be had at once.

Foreign Bodies in the Ear.—Children often put peas, shoe-buttons, beads, and similar objects into their ears. If the object is at all deeper in than the opening, its removal should be left to a physician. Should no physician be available, the mother may try to do something herself. The child should be laid upon the affected side and the tip of the ear be strongly pulled outward and backward, thereby straightening the canal, whereupon the object will sometimes drop out of itself. If it does not, syringing with tepid water may be employed. For this purpose should be used the little bulbous syringe described on p. 299. In an emergency the syringe used for giving enemata may be employed. The child should be seated, the ear drawn outward and backward, and the nozzle placed at the upper part of the opening of the canal, in order that the water may get behind the object and wash it out while returning.

After all, however, a foreign body in the ear does little harm as long as it is giving no pain. Certainly there is less risk in leaving it there until a convenient time comes for having a physician remove it than there is in unskilful meddling with it, which may only drive it further in or do harm to the canal or the drum. Sometimes an insect crawls into the ear and occasions much suffering by scratching against the drum-membrane. Sweet oil or castor oil should be poured in at once, and the ear syringed with water after about half an hour.

Swallowing of Foreign Bodies.—The swallowing of

such articles as coins, marbles, buttons, etc. usually need give no anxiety. It is often advised to give the child plenty of potato or bread to eat, on the ground that this coats the object and allows it to pass from the bowel without doing any harm. No laxatives are necessary. Sometimes, however, the body, especially if angular or pointed, such as a fish-bone, jackstone, or pin, sticks in the throat and causes choking. If this occur, the child should at once be suspended by the feet and slapped upon the back in the effort to dislodge the object. If it is high in the throat, a cautious attempt should be made to grasp it with the finger and thumb. If it has seemed to stick some distance lower in the passage to the stomach, the child should be made to swallow several large mouthfuls of soft food, which may carry the body downward with them. A physician must, of course, be called in.

Foreign Bodies in the Nose.—As in the case of the ears, children often put small objects into the nose and forget their presence or fear to speak of it. At last an obstinate inflammation or discharge arouses the suspicion that something is wrong. If the object is not too far in, or is not too firmly held by the swelling of the mucous membrane or by its own increase in size, which the absorption of moisture often produces, it may sometimes be removed by having the child blow its nose vigorously or by tickling the nose or giving snuff to produce sneezing. If this does not succeed, a physician should be summoned to remove the object, since injury follows unskilful efforts to get it out.

Nose-bleed.—Some children are very liable to nose-bleed without any apparent reason, while others never have it except as the result of a fall or a blow. Among

the causes, in addition to idiosyncrasy, are disturbances of the stomach, irritation of the nose by cold or by other causes, malaria, typhoid fever, and disease of the blood, heart, or liver. The flow of blood may become quite weakening, but is usually only slight. The child should be put at rest with the head elevated and held a little back. Firm pressure should be made on the upper lip at the outer edge of each nostril, and at the root of the nose just at the inner angle of each eye. This obstructs the flow of blood by compressing the arteries. If this does not answer, a piece of ice may be held on the forehead just above the nose, and another at the back of the neck ; or, if this fails, the nose can be syringed with a solution of tannin in water (Appendix, 87), and the child given a mustard foot-bath. Both while the blood is still flowing and afterward, blowing of the nose must not be allowed. In very bad cases a physician may need to plug the nostrils with pieces of cotton attached to strings, but this is seldom required. In cases, too, in which nose-bleed frequently recurs medical advice ought to be had.

Poison-ivy Rash.—An intense inflammation of the skin may be produced by the leaves of several species of sumach. The one most commonly met with is the *poison ivy* (*Rhus toxicodendron*), a vine with dark-green, very shining leaves arranged in clusters of *three* and with the edges smooth or only slightly and irregularly toothed (Fig. 91). It is found in abundance climbing over fences and trees in many localities. When it has nothing to climb on it forms a low, bushy growth two or three feet high, and is then called the *poison oak*. Nurses should be able to recognize the plant, in order that they may keep their charges away from it. The only common plant that at all resembles it is the Virginia creeper,

which, however, has its leaves in clusters of *five* (Fig. 92). Some children can handle poison ivy with impunity, while others become badly poisoned by the slightest

FIG. 91.—Leaf of the poison ivy.

FIG. 92.—Leaf of the Virginia creeper.

touch or even by close proximity to it. The *swamp dogwood* or *poison elder* (*Rhus venenata*) is another species of sumach even more virulent than the poison ivy. It is a shrub ten to eighteen feet high, with leaves in clusters of from seven to thirteen. Its situation in swamps makes it less dangerous to children. On the Pacific coast is still another poisonous species of sumach (*Rhus diversiloba*), which also goes by the name of poison oak.

The rash of poison ivy usually comes out in abundance within a few hours or a day after exposure. In this respect it differs from eczema, which is slower in spreading. The skin becomes swollen, red, hot, and itching, and is thickly covered with vesicles of from pin-head to split-pea size. These soon discharge their watery contents, which dry into crusts over the surface. The face often becomes so swollen that the child can scarcely open its eyes and is really a pitiable object. The disease lasts a week or

longer, except in the very mildest cases. A useful application is a diluted preparation of *Grindelia robusta* (½ drachm of the fluid extract in 8 ounces of water). Thin cloths wet with this should be applied, allowed to dry, removed, re-wet, and reapplied. Sometimes an oily dressing will act more serviceably upon the heat and tenseness, as it is without the discomfort which attends the drying of a watery application. Thus, carbolized oil (Appendix, 76) diluted with an equal quantity of sweet oil may be smeared on the skin frequently, if the inflamed area is not too extensive (see remarks in Appendix, 81). A very useful plan of treatment consists in dabbing the affected parts with "black wash" (to be purchased from the druggist), and, before they are quite dry, smearing them with oxide-of-zinc ointment. This may be done several times a day. In this connection may be mentioned the fact that various drugs are, in some persons, capable of producing eruptions upon the skin.

Fainting.—This consists of loss of consciousness, with pallor, due to a sudden temporary weakness of the heart. It is more apt to develop in later childhood than earlier. The child should be placed with the head low; sometimes lower than the rest of the body, and have the face slapped with a wet towel or water dashed into it. Access to fresh air should also be obtained.

Drowning.—Drowning, or suffocation from any other cause, is an accident for which every mother ought to be prepared, as there is rarely time to send for medical aid. An effort should be made at resuscitation, even though there seem to be not the slightest chance of doing any good. As soon as the child is taken out of the water it should have the clothes loosened about the neck and be

suspended or turned upon the face for a second or so, to allow the water to run out of the mouth. It should then be laid on the back with the shoulders slightly raised by a folded coat placed under them, but with the head touching the ground. The tongue should now have a handkerchief or cloth wrapped around it and be drawn well out of the mouth and held thus. Artificial respiration must now be commenced *on the spot*, following what

FIG. 93.—Resuscitation after drowning: first movement.

is known as "Sylvester's method." Someone kneels behind the unconscious child, seizes the arms, and swings them around horizontally close to the ground until they meet above the head (Fig. 93). They are kept there for a moment, pulling upon them strongly the while. The whole manœuvre lasts two or three seconds, and is intended to expand the chest and to make air enter it. The arms are then brought to the sides of the chest and given a forcible push against the lower ribs (Fig. 94). The second manœuvre lasts only about a second. Its object is to expel the air from the lungs. There should be sixteen or eighteen of the artificial inspirations, and, of course, an equal number of expirations, made in one minute. The movements should be kept up for a long time —even as long as a couple of hours—until it is absolutely certain that the heart, *not* the pulse, has ceased beating

While artificial respiration is being conducted, someone should quickly remove the wet clothing, dry the body, and apply warmth in any form—as hot water, hot bottles, stones heated in fires which may be built close by, hot sand if at the sea-shore, etc. The limbs should be rubbed in the direction from the extremities toward the heart, in order to favor the circulation of blood. When

FIG. 94.—Resuscitation after drowning: second movement.

breathing begins the artificial respiration must be made to keep time with it as much as possible, so as to help and not to hinder it. The inhalation of smelling-salts and the shock produced by slapping the face with a wet cloth aid in inciting respiration. The child should be given stimulants in moderate amounts as soon as it can swallow. It ought not to be moved from the spot, unless the coldness of the weather necessitates it, until it is thoroughly convalescent.

Swallowing of Poisons.—Scarcely anything in the realm of household medicine can be more important than the treatment of poisoning in its various forms, since in this, of all things, knowledge, presence of mind, and promptness are of so much avail. Prevention is far better than cure, and can usually be accomplished by allow-

ing nothing of a dangerous nature to be about. The precautions in the care of medicines detailed in Chapter X., pp. 230, 234, should be carefully followed, and the baby be kept from access to the match-box or to toys colored with poisonous pigments.

The symptoms of the various forms of poisoning constitute too complicated a subject to discuss here. All the mother needs to know is what to do in case she suspects that poison has been taken. Of course some one will be sent for a doctor at once, with a message *telling him what has happened, and, if possible, what poison has been swallowed.* These details are most important in order that he may come prepared. At the same time the mother will begin treatment immediately. When the nature of the poison is unknown, the first thing to do is to empty the stomach by an emetic (Appendix, 111), or to encourage vomiting in the same way if it is already going on. Next, some antidote must be given which is capable of neutralizing a good many different sorts of poisons. Such an one is that known as *Jeaunel's general antidote* (Appendix, 110), which neutralizes acids, arsenic, digitalis, and zinc, and to some extent copper, morphine, and strychnine. It is of no value against phosphorus, and of but little against corrosive sublimate. After the antidote, which must be given freely, "soothing drinks" of various kinds should be administered, such as milk, raw white-of-egg alone or dissolved in water, solutions of gum arabic, flour and water, flaxseed tea, barley-water, slippery-elm-water, etc.

The following table shows in convenient form some of the principal poisons and their antidotes. The antidote italicized is the direct antagonist of the poison. In addition, it may be stated that stimulants and external heat are needed in all cases of poisoning, of whatever sort, if

the child grows cold and weak, and complete rest in bed in all except narcotic poisoning, as by opium and chloral. Artificial respiration may be tried whenever respiration seems disposed to cease. It is carried out in the same way as for cases of drowning.

TABLE OF POISONS AND ANTIDOTES.

POISON.	ANTIDOTES.
Unknown	Emetic, followed by Jeaunel's antidote and soothing drinks.
Acid, acetic, hydrochloric, sulphuric, nitric.	*An alkali;* such as magnesia, chalk, whiting, soda, soap; followed by soothing drinks or sweet oil.
Acid, carbolic; creosote	*Epsom salts* in abundance; soap; no oil.
Acid, oxalic, including "salts of lemon."	Emetic, followed by *lime* (as chalk, plaster, whiting) or *magnesia*, but not by potash or soda; then soothing drinks.
Acid, prussic	Fresh air; ammonia to nostrils; cold douche; artificial respiration.
Aconite	Emetic, followed by *digitalis;* no pillow under head; free stimulation.
Alcohol (brandy, etc.)	Emetic; cold douche on head; warmth and artificial respiration.
Alkalies (as ammonia, spirits of hartshorn, lye, caustic potash).	*Vinegar* or *lemon-juice*, followed by soothing drinks or sweet oil.
Antimony (tartar emetic)	Emetic if vomiting is not already profuse; then *tannic acid* freely, or strong tea; later, milk or other soothing drinks; finally, castor oil to empty the bowels.
Arsenic (Fowler's solution, Paris green, "Rough on Rats").	Emetic, quickly followed by *plenty of a fresh mixture of the tincture of chloride of iron with calcined magnesia, washing or baking soda, or water of ammonia, or by Jeaunel's antidote.* Then white of egg, soothing drinks, or sweet oil; castor oil to empty bowels.

Atropine (see *Belladonna*).	
Belladonna (atropine) . .	Emetic; *tannic acid* freely; cold to head; coffee. Stimulants and warmth if needed.
Blue stone; blue vitriol (see *Copper*).	
Chloral	Treatment as for opium-poisoning.
Chloroform, inhaled . . .	Cold douche; friction of skin; inverting child; artificial respiration.
Copper (blue stone; blue vitriol; verdigris).	Emetic, followed by *white of egg* or *milk*, *yellow prussiate of potash*; then soothing drinks.
Corrosive sublimate . . .	Emetic, followed by *white of egg* or *milk*; soothing drinks; tannic acid freely; castor oil to open bowels.
Cyanide of potash (see *Acid, prussic*).	
Fowler's solution (see *Arsenic*).	
Gas (illuminating gas, coal-gas).	Fresh air; artificial respiration; ammonia to nostrils; cold douche.
Iodine	*Starch* or *flour* mixed with water, given freely; emetic; soothing drinks.
Laudanum (see *Opium*).	
Lead (sugar of lead) . . .	Emetic, followed by *Epsom salts*; white of egg or milk; alum.
Matches (see *Phosphorus*).	
Morphine (see *Opium*).	
Nux vomica (see *Strychnine*).	
Opium (including laudanum, morphine, paregoric, soothing syrups, etc.).	Emetic (but generally useless); *permanganate of potash* in doses of 4 or 5 grains if case is seen early; strong coffee; atropine; keep child awake and breathing by cold douche to head and spine, walking, etc., but not to extent of exhaustion; artificial respiration.
Paregoric (see *Opium*).	
Paris green (see *Arsenic*).	

Phosphorus (match-heads, some roach and rat poisons).	Emetic; then *permanganate of potash* in doses of 4 or 5 grains well diluted; then Epsom salt or magnesia to open bowels, but no milk or oil of any kind.
Poisonous plants (Jimson weed, poisonous mushrooms, deadly nightshade, tobacco, etc.).	Emetic, followed by tannic acid; strong coffee or brandy; ammonia to nostrils; external warmth; artificial respiration.
Prussic acid (see *Acid, prussic*).	
Silver nitrate (lunar caustic).	*Table-salt*, followed by emetic; milk or white of eggs.
Spoiled food	Emetic, followed by castor oil as purgative.
Strychnine (nux vomica) .	Emetic, followed by tannic acid, *bromide of potash* freely, or chloral.
Tartar emetic (see *Antimony*).	

APPENDIX.

In this Appendix are grouped, for the sake of convenience, a somewhat heterogeneous collection of subjects, which may be classified under—I. Dietary; II. Remedies for Local Use; III. Remedies for Internal Administration; and IV. Miscellaneous. The various minor divisions are numbered, and the references scattered here and there in the preceding chapters refer to these.

In measuring tablespoonfuls of the various dry substances which may be mentioned later the spoon should have the substance poured into it until it is heaped; then be tapped smartly against the table two or three times, and then be leveled by scraping off the excess with a case-knife.

I. DIETARY.

Under this heading we may consider some of the special foods for babies and older children, particularly those intended for use in sickness. The preparation of ordinary articles, such as jellies, broths, soups, and the like, may be found described in any good cook-book, and is too extensive a subject to be touched on here.

1. **Barley-Water.**—Put 1½ level tablespoonfuls of whole barley into an enamelled saucepan; boil for not more than five minutes and throw the water away. Then add 1 quart of water; allow to simmer slowly down to 1 pint; strain.

Often ordered as a diluent for, or as a temporary substitute for, milk in cases of vomiting of infants.

In place of whole barley a barley flour may be used, when economy of time is desired, as follows:

Rub up 1 level tablespoonful of barley flour with a little cold water, stir into 1 pint of water, simmer for fifteen minutes with stirring; strain.

2. **Barley Jelly.**—A stronger solution of barley, which will jelly when cold, is made by using 4 level tablespoonfuls of whole barley or 3 or more level tablespoonfuls of barley flour with the amounts of water specified, and following the methods described in the previous section. A double boiler may be used with advantage to prevent burning.

3. **Albumen-Water.**—The raw white of one or two eggs dissolved slowly in a glass of cold water. Sweetened if desired, and strained only if necessary to prevent clogging of the rubber nipple by minute shreds. It may be warmed only slightly before given. It is useful as a temporary nourishment when milk does not agree.

4. **Barley and Egg.**—A combination of Nos. 2 and 3 may be made as follows:

Barley-water,	10 ounces;
White of egg,	1;
White sugar,	1 to 2 teaspoonfuls.

5. **Oatmeal-Water.**—Stir 2 level tablespoonfuls of oatmeal into 1 pint of boiling water; cover and let simmer for an hour. Replace the water as it evaporates. Strain.

Often prescribed in place of plain water for diluting milk when constipation exists.

6. **Oatmeal Jelly.**—For making a jelly at least 4

level tablespoonfuls are required. This should be added to 1 pint of water and cooked as in preparing oatmeal-water. A double boiler is of service to prevent burning.

7. **Arrowroot-Water.**—Wet 1½ level tablespoonfuls of Bermuda arrowroot with a little cold water and rub until smooth; then stir into 1 pint of boiling water and boil for five minutes, stirring all the while.

Often added to milk mixtures to prevent the tendency to form hard curds.

8. **Arrowroot Jelly.**—Rub 4 level tablespoonfuls of arrowroot with a little cold water, add to 1 pint of water, and boil for five minutes in a double boiler.

9. **Toast-Water.**—On two or three slices of bread, toasted dark brown, but not burned, pour 1 quart of boiling water; allow to stand until cool; strain.

Useful in some cases of sick stomach.

10. **Rice-Water.**—

Rice (well washed),	2 level tablespoonfuls;
Warm water,	1 quart.

Let stand an hour in a warm place; then boil slowly to 1 pint; strain.

Sometimes useful for diluting milk in cases of diarrhœa.

11. **Gum-Arabic Water.**—

Gum Arabic,	2 level tablespoonfuls;
Boiling water,	1 pint.

Dissolve; sweeten. Add the juice of a lemon for older children.

Sometimes useful for infants in place of barley-water.

12. **Flaxseed Tea.**—

Flaxseed (whole),	1½ level tablespoonfuls ;
Boiling water,	1 pint.

Let stand and keep warm for an hour ; strain ; sweeten. Add the juice of a lemon for older children.

13. **Gelatin Solution.**—20 grains of gelatin are soaked for a short time in cold water and then dissolved by stirring in ½ pint of boiling water.

Sometimes used in place of barley-water.

14. **Dr. J. F. Meigs' Gelatin Food.**—Gelatin-water is prepared as in the last formula. As soon as the gelatin is dissolved, and while the water is still boiling, add 1 teaspoonful of arrowroot which has been previously rubbed up into a paste with a little cold water. Milk and cream are added at the same time in varying proportions.

The late Dr. J. F. Meigs found this to agree with many sick children when other foods failed.

15. **Whey.**—To 1 pint of warm milk of about 100° F., not previously boiled or sterilized, add 2 teaspoonfuls of essence of pepsin or liquid pepsin, or 2 teaspoonfuls of liquid rennet, or ½ a rennet tablet dissolved in 1 tablespoonful of lukewarm water. After it stiffens, beat up the curd with a fork. Strain off the whey through a thin flannel cloth. If it is to be added to cream, first pasteurize the whey to stop further action of the rennet or pepsin or the cream will curdle. A pint of milk will make from 8 to 12 ounces of whey. As the different rennet preparations vary in strength, follow the directions coming with them as to the amount to be used.

Useful for delicate stomachs which cannot bear milk.

16. **Whey-and-Egg Mixture.**—In 7 ounces of whey prepared as described stir the white of an egg. Strain if necessary. This is an excellent temporary diet in cases of disturbed digestion or in fever.

17. **Cream-and-Whey Mixture.**—

Cream,	1 ounce;
Whey,	7 ounces;
Milk-sugar,	2 teaspoonfuls.

The whey-and-egg mixture just described may be substituted for whey if it is desired to make the preparation still more nourishing. The amount of cream in the formula will vary greatly with the needs of the child. It can best be determined by the physician.

18. **Wine Whey.**—While boiling ½ pint of milk add 2 ounces of sherry wine. Strain.

19. **Veal Tea.**—Cut fine 1 pound of veal as free from fat as possible; put into 1½ pints of cold water; keep hot without boiling for three or four hours; strain; let cool; skim off the fat.

Sometimes ordered in cases of weak digestion in infants.

20. **Flour-Ball.**—Tie 1 pound of flour tightly in a bag and boil for ten hours. After it is cold take it out of the cloth and dry it for ten hours. Then peel off the outside coat of dough. The hard ball which remains should be grated when needed and mixed with milk in varying proportions: 1 or 2 teaspoonfuls to 8 ounces of diluted milk is generally sufficient.

Formerly much used in some cases of delicate digestion.

21. **Beef Tea.**—To 1 pound of lean beef, minced and free from fat, skin, and tendon, add 1 pint of cold water. Stir and let stand in an earthen vessel for an hour; then heat well, but without boiling, for another hour; strain and let cool. When about to use, remove all the fat with a piece of soft paper, warm, and season with salt.

22. **Beef Tea Rapidly Made.** — Place 1 pound of scraped lean beef in ½ pint of boiling water in an enamelled saucepan; cover; keep gently warm for ten minutes; strain into a teacup, and place the cup in ice-water. When cold, skim off all fat, pour into a warmed cup, warm gently, season, and use.

Beef teas made by this and the preceding recipe are more palatable than some of the ready-made beef-extract preparations, but have little nutritive value as compared with peptonized beef foods.

23. **Scraped Raw Meat.**—Take a thick piece of raw tenderloin or round steak as free from tendon and fat as possible, scrape, grate, or mince it very fine, and then pound it in a mortar until it is reduced to a pulp. Now rub it through a fine sieve; flavor with salt or occasionally with sugar. For younger children rub it up with a little water until it is of the consistence of thick cream, and feed it from a spoon.

This is very nourishing in some of the wasting diseases. A child of a year or less should begin with not more than two teaspoonfuls during the course of a day. There is the possibility of tape-worm being acquired by the use of raw meat. To prevent this the steak may be cooked slightly first and then the brown outside layer cut away.

24. **Beef-Juice.**—Cut into rather thin pieces, season with salt, and very slightly broil 1 pound of round or tenderloin steak free from fat. Then cut into smaller pieces and express the juice with a lemon-squeezer or, much better, with one of the meat-presses to be bought at the druggist's (Fig. 95). The pound of meat will give from 2 to 4 ounces of beef-juice or thereabouts. The juice can be warmed only slightly after it is obtained, or it will coagulate. It may be given cold if desired. Occasionally infants prefer it sweetened.

FIG. 95.—Meat-press.

25. **Beef-Juice, No. 2.**—Another method recommended when a lemon-squeezer or a press is not at hand is the following:

Chop 1 pound of beef very fine, salt slightly, place in a jar, add 8 ounces of water, stir thoroughly, stand on ice for six or more hours. Strain through cheesecloth or muslin by twisting this hard. This method gives probably twice as much juice as the first, but it is more diluted.

26. **Lime-Water.**—Place a piece of unslaked lime the size of an egg in 1 gallon of water in an earthen vessel. Stir and let settle; pour off the first water and add fresh. Keep covered to exclude the dust. Use from the top. Add water and stir from time to time.

27. **Peptonized Food.**—The failure of the power of digestion renders predigestion (peptonizing) of the food necessary in some cases. Pepsin, the secretion of the

stomach, may be utilized for this purpose, but for several reasons the secretion of the pancreas, often combined with bicarbonate of soda, is generally employed. Although there are various equally good pancreatic preparations on the market, such, for instance, as those of Parke, Davis & Co., and Armour & Co., yet for sake of convenience, and because it is very well known, the pancreatic extract of Fairchild Bros. and Foster is the one mentioned in the following recipes. Besides being sold in bulk, it is conveniently furnished in the form of "peptonizing tubes," each glass tube containing 5 grains of extract of pancreas and 15 grains of bicarbonate of soda, and being sufficient to peptonize 1 pint of milk. As the tubes are rather expensive, one can just as readily have a small number of powders put up at a drug-store, each containing the proper amount of pancreatic extract and soda. These absorb moisture readily, and will not keep good very long in this form; consequently they must be used promptly.

In the peptonizing of any food it is important to remember that warmth is necessary for the action of the digestant, while cold checks it, and too great a heat destroys it altogether. The food undergoing peptonizing should be kept at a temperature of about 115° F.—that is, never so hot that the finger could not be kept in it without discomfort. The peptonizing must not be allowed to become quite complete, or the bitter taste of peptones will be produced. This does not injure the food in the least, but may make the child unwilling to take it. The food should be tasted frequently during the process, and on the development of the slightest bitterness the temperature should be quickly raised to the boiling-point or the food be put quickly on ice. The temperature of boiling is sufficient to destroy the digestant to a large

extent, and consequently to interfere with further peptonizing. The chilling by ice arrests the action of the pancreatin, but only while the milk is kept cold. On the whole, boiling is to be preferred as more manageable.

28. **Peptonized Milk.**—Add to 4 tablespoonfuls of cool water the contents of a peptonizing tube; stir until dissolved; add to 1 pint of cool milk, and put the vessel containing this into water of a temperature of 115° F.; let it remain there for ten minutes, or for a shorter time if the slightest bitter taste develops. Then put at once on ice or, better, heat quickly to boiling.

29. **Sterilized Peptonized Milk-Mixture.**—Prepare the infant's milk-mixture according to the formula ordered by the baby's physician. Then add the peptonizing powder in the proportion of one tube to each 16 ounces of combined milk and cream. For instance, if the formula on page 143 should be prescribed, we have $3\frac{1}{2}$ ounces of milk and cream in each 8 ounces of the mixture. That is to say, each 8-ounce bottle contains $\frac{3\frac{1}{2}}{16}$ of a pint of milk and requires $\frac{3\frac{1}{2}}{16}$, or about $\frac{1}{4}$, of the contents of a tube. After adding the amount of powder required for the day to a small quantity of the water to be used, shake thoroughly, add to the rest of the milk-mixture, and peptonize as just described, finishing the process by raising the temperature quickly for a moment to that of boiling. Now place the proper amount of the food in each bottle, put the bottles in the sterilizer, and sterilize for half an hour. This will be long enough, on account of the previous scalding.

Instead of this plan, we may mix the milk and cream, add one peptonizing tube to each 16 ounces, and peptonize. Then rapidly mix with milk-sugar and water

according to whatever formula may be prescribed, place the proper amount in each bottle and sterilize. This must be done quickly enough to prevent the bitter taste from developing. No alkaline solution need be used in making the mixture, as there is sufficient soda in the peptonizing tubes. If the bitter taste develops in this way in spite of care, we must first sterilize the milk-mixture in each bottle in the usual way, then, just before using a bottle, uncork it and add the proper amount of peptonizing powder as described in the next section (Appendix, 30).

30. **Pasteurized Peptonized Milk-Mixture.**—Since the temperature employed in pasteurizing is not sufficiently high to arrest the action of the peptonizing powder, the only feasible method is to prepare the bottles of pasteurized milk as described on page 152, and to keep them until needed. Then, as each bottle is about to be used it should have added as much of the contents of a peptonizing tube as is necessary to digest the combined amount of milk and cream in it (see Appendix, 29), be shaken thoroughly, stood in water of 110° to 115° F. for five or ten minutes, cooled down slightly to the proper temperature for feeding, and given to the baby at once, before the peptonizing has a chance to advance too far. A little trial will show the length of time required in order to stop the process short of developing a bitter taste. This method is often called *partial peptonizing*. We must remember that the action of the pancreatin continues in the bottle while the infant is nursing, and that the last portion of the contents may grow too bitter. In such case a shorter time of warming must be used. The same method may, of course, be used when the milk-mixture is used raw; *i. e.*, without either sterilization or pasteurization.

A "Peptogenic Milk-Powder" is manufactured by the makers of the peptonizing tubes, and has been largely used. It does not differ in any way in composition from the powder in the tube except that it has a fixed amount of milk-sugar and mineral salts, and is intended to be used with only certain fixed proportions of milk. This is a great disadvantage, as it does not permit of altering the proportions of the ingredients of the milk-mixture to suit the individual child. The methods described are much to be preferred.

31. **Peptonized Beef Tea.**—Mix 8 ounces of finely-minced beef, free from fat, with 1 pint of water. Simmer from one to two hours with frequent stirring. Cool down to 110° or 115° F.—that is, a temperature not hot enough to give discomfort to the finger if held in it—and empty into it one peptonizing tube. Stir until dissolved. Keep at the same temperature for an hour or two with occasional stirring, avoiding any bitter taste. Then boil for a moment, strain, and season.

32. **Peptonized Oysters.**—Boil for a few minutes in a saucepan half a dozen large oysters with their juice and ½ pint of water. Remove the oysters, mince and mash them to a pulp, and put this into a glass jar with the broth. Add 15 grains of bicarbonate of soda and 15 grains of extract of pancreas, and keep at 115° F. for one and a half hours or less, avoiding any decidedly bitter taste. Then put into a saucepan, add ½ pint of milk, and heat to boiling. Season.

33. **Peptonized Gruel.**—Gruel may be made in the ordinary way; as, for example:

Arrowroot, fine oatmeal, wheat flour, sago, or other farinaceous substance,	1 tablespoonful or more;
Cold water,	½ pint.

Mix thoroughly and boil well for a few minutes with constant stirring until quite thick. Then stir in ½ pint of cold milk and empty in one peptonizing tube. Keep warm (115° F.) for twenty minutes, or less than this if the faintest trace of bitterness develops. Then strain, and quickly raise it to boiling to stop further action.

34. **Peptonized Milk Toast.**—Milk toast in which there is plenty of milk may be peptonized by making it into a pulp and then stirring in the contents of a peptonizing tube, and proceeding in the same way as for peptonizing gruel.

35. **Peptonized Milk Punch.**—Fill a tumbler one-third full of crushed ice. Put in it as much stimulant as suits the age of the child (pp. 420, 422); fill up with peptonized milk; sweeten according to taste, and grate a little nutmeg over the top.

36. **Nutrient Enemata.**—For the giving of nutrient enemata one of the syringes already figured and described can be employed (pp. 259, 260). As the bowel has only feeble powers of absorption, it is better to have the food already in a predigested state. To ensure its being absorbed and retained it is better to have the food already in a predigested state and to give only very small amounts at one time: ½ to 1 teaspoonful is enough at one year of age; 1 teaspoonful to 1 tablespoonful from one to four years; and from 1 to 8 tablespoonsfuls up to

twelve years. Any of the reliable peptonized meat preparations on the market may be employed in concentration much greater than is directed for use by the mouth. Such articles as defibrinated blood and other blood preparations, although not predigested, are readily absorbed and are of great value.

Predigested nutrient enemata may be made at home by the use of pepsin or, especially, pancreatic preparations. Milk peptonized in the way already described can be given, or the warmed milk may be mixed with the peptonizing agent and injected at once.

It must be said, however, that nutrient enemata are of little value in infancy, owing to the difficulty in having them retained.

37. **Peptonized Beef Enema.**—A peptonized beef enema may be made as follows:

Add 1 tablespoonful of minced lean raw beef to 4 tablespoonfuls of water. Heat to boiling. Rub through a colander. When only warm, add the contents of a peptonizing tube and inject at once.

38. **Peptonized Egg Enema.**—This is a useful nutrient enema made by adding the contents of a peptonizing tube to the white of one egg previously dissolved in three times its volume of water.

II. Remedies for Local Use.

1. Baths.

39. **Baths in Sickness.**—In a medical sense a "bath" is the application of water in nearly any way, either to the entire surface of the body or to part of it. Although there are many other varieties, we may limit our consideration to the following:

(*a*) Whole baths, including—

1. Sponge bath;
2. Tub bath;
3. Shower bath;
4. Sheet bath;
5. Vapor bath;
6. Medicated bath (mustard, starch, soda, salt, sulphur, bran, disinfecting).

(*b*) Partial baths, including—

7. Foot bath;
8. Wet compresses, including fomentations.

From another point of view baths may be distinguished according to the temperature of the water. A convenient classification is the following:

1. Cold bath, temperature of 40° to 70° F.
2. Cool " " " 70° " 80° "
3. Tepid " " " 80° " 90° "
4. Graduated bath, " " 85° " 90° " reduced.
5. Warm bath, " " 90° " 100° "
6. Hot " " " 100° " 110° "

These definitions of temperature are used in the descriptions which follow.

40. **Sponge Bath or Ablution.**—This is the simple, general washing of the body with wash-cloth or sponge. It may be used as a remedial agent as well as for cleanliness. In sickness even more than ordinary care is often needed to prevent taking cold. When, however, there is fever, it is almost impossible to give a child cold by sponging. The sick child should be undressed completely, unless too weak, and put between blankets. The sponging must be performed rapidly and under the covers, [illegible] at a time and drying it before going to [illegible]. Begin with the [illegible] hands, arms, face and head, [illegible] back, chest, abdomen, lower extremities

The child should be rolled from one side to the other if too weak to be lifted. The sponge or wash-cloth need not be wet enough to be sloppy.

Warm sponging is often very serviceable to allay restlessness. *Tepid sponging* or *cool sponging* is an excellent means of reducing fever. *Cold sponging* is still more so, but must not be given except by a physician's order. The sponging may last ten or fifteen minutes and be repeated every couple of hours or oftener as needed. The addition of alcohol or bay rum adds to the cooling effect. When the fever is threateningly high and cold sponging is to be used, the child should not be covered at all; a rubber sheet is placed beneath the blanket, and the sponge may be large and saturated with water. On account of the fear which some physicians have of the use of water in eruptive fevers, no sponging at all should be used in such cases until the doctor has been consulted. Sponging with bathing-whiskey or with a mixture of equal parts of alcohol and water containing all the alum that will dissolve in it is useful where there is much perspiration or when the skin seems tender and liable to become sore (Appendix, 88). Alum will not dissolve at all in alcohol alone.

Cold sponging is also an excellent tonic remedy in children who are somewhat debilitated or who are prone to take cold very easily. The child receives its tub bath in the ordinary manner, and then as a last touch has water of a temperature of from 60° to 70° squeezed over it from a large sponge. A brisk rubbing with a Turkish towel follows.

41. **Tub Bath.**—The use of the tub for washing has already been described. The *warm tub bath* is of service in disease, but must be given with the greatest precau-

tions against subsequent chilling. It is often ordered for the purpose of bringing out and keeping out the eruption of measles or scarlet fever in severe cases in which the gravity of the symptoms is associated with the failure of the rash to develop properly (see remarks on Fever, p. 347). It may well be given at the onset of any acute febrile disease. It is also useful for producing perspiration and in this way checking a cold, allaying nervous excitement and thus producing sleep, reducing moderate fever, and stopping an attack of convulsions or of spasmodic croup. To get the full effect the child should be taken from the bath after ten or more minutes' immersion, placed quickly between warm blankets without being dried, and covered well in bed. When the bath is used to produce sleep, the child may be dried and the blanket dispensed with. Cases of eruptive fever should not be given warm baths—except the one given at the onset—unless medical advice be first obtained.

The *cold* or *cool tub bath* intended for medical purposes should be employed only if the physician orders it. It is not often given to young children unless there is very high fever which cold sponging or tepid tubbing fail to reduce. Many young children with fever do not bear cool tub baths well. Even in later childhood they are often not well tolerated. The use of the *tepid bath* is probably the best method known at the present time for treating typhoid fever in children. A modification of this consists in putting the child in a warm bath and then gradually cooling the water until the proper temperature is reached. This is called the *graduated bath.*

The *hot tub bath* is a very powerful stimulant, rarely to be used without the physician's order. Sometimes a baby which seems to be rapidly failing in strength or

growing cold, or becoming greatly oppressed in breathing from some disease of the lungs, will revive in a wonderful manner if plunged into a bath of 105° or 110° F., kept there one to two minutes, taken out, and wrapped in blankets without drying. Of course, gentleness and absence of sudden movement are absolutely essential in such threatening states. It must also be said that the hot bath sometimes appears to make the child worse. In such a case it must be discontinued at once.

42. **Shower Bath.**—The *cool* shower bath is to be used only in later childhood as an excellent nervous and muscular stimulant. The *cold* shower bath should never be used unless a physician orders it.

43. **Sheet Bath, or Wet Pack.**—This may be either hot or cold. To give a *cold pack*, a rubber cloth should be put over the bed and a sheet be wrung out in cold water and laid upon it. The child is now stripped, placed upon and enveloped in the sheet with the exception of the head, and then wrapped outside of all with a blanket. The feet may be left out if it is desired, in order that a hot-water bag may be put to them should this seem advisable. The cold pack is often useful to quiet very great nervousness and to produce sleep. The child may be left in it for an hour or so if it goes to sleep; or, if it does not, may be taken out in fifteen minutes and wrapped in a warm, dry blanket. The pack is also employed for reducing moderate fever, but in order to be of any service it must be renewed every five or ten minutes ten or twelve consecutive times if the temperature is high; the whole process lasting about an hour. Where fever is extremely high a pack with ice-water is sometimes employed. The child is stripped and covered with

cloths dipped in the ice-water, not forgetting to place them on the head. The cloths must be redipped every two or three minutes, and the rectal temperature must be taken very frequently to guard against too great a fall, as the remedy is a powerful one.

A *hot pack*, or *blanket bath*, is given by wrapping the child in blankets wrung out in hot water, and covering with several dry blankets. The pack may be renewed in half an hour. It produces perspiration in the same way as the warm bath with subsequent blanket wrappings.

44. **Vapor Bath.**—This is used to relieve the dropsy of Bright's disease by producing free perspiration. The bed is well covered with blankets which reach nearly or quite to the floor, but which are kept off the child by half barrel-hoops or by a chair in the bed or in some other way. A stream of vapor from a kettle or pan of boiling water is conducted by a tin pipe beneath the cover, taking care that it does not come in too hot a state against the body. Other methods of producing vapor consist in placing a vessel of slaking lime, or a bucket of water with hot bricks dropped into it, under the bed in such a way that the vapor can rise at the sides and reach the child under the covers.

45. **Hot-air Bath.**—This is used for the same purpose as the vapor bath, of which it is a modification. The hot air from an alcohol lamp is conducted under the covers by a tin pipe, the heat producing profuse perspiration.

With either of these baths great care must be observed that the bed clothing does not become ignited by the flame of the lamp.

46. **Mustard Bath.**—Mustard is added to the warm

tub bath in the proportion of ½ or 1 ounce (2½ to 5 level tablespoonfuls) to 1 gallon of water. This is superior to the simple warm bath for bringing out the rash in eruptive fevers (see p. 348), and is a powerful stimulant when the child is rapidly failing from any cause. It is especially useful in infancy and early childhood.

47. **Starch Bath; Starch-Water.**—The starch bath should be made of the strength of ½ a cupful of boiled starch to every 4 gallons of water. If the starch has jellied, it may be broken up with the hand or pressed through a coarse wet cloth. The bath is very useful for hives and some other irritating skin affections.

A smaller quantity of starch-water for washing the skin or for douching the intestine (page 260) may be made by adding to each pint of boiling water 2 level teaspoonfuls of pulverized starch, and stirring until smooth. The starch should first be rubbed into a paste with a little cold water. For giving small injections the starch-water is often made decidedly thicker.

48. **Soda Bath.**—This consists of 1 tablespoonful of washing soda to every 4 gallons of water. It is used for the same purpose as the starch bath, with which it is very commonly combined by dissolving the soda in the starch-water.

49. **Salt Bath.**—This may be made by dissolving ordinary salt, rock salt, or prepared sea-salt in water in the strength of 4 ounces (8 level tablespoonfuls) to 1 gallon. Given tepid or cool and followed by brisk rubbing, it is a valuable tonic, especially for rickety children.

50. **Sulphur Bath.**—This is made by dissolving 20 grains of sulphide of potash in each gallon of water. It cannot be given in a metal tub. It is considered of service in chronic rheumatism and in some affections of the skin.

51. **Bran Bath.**—Enough bran may be put in the hot bath to make it milky. As this would choke the pipes of stationary bath-tubs, the bath can be made by putting a pound or more of bran into a thin muslin bag and boiling this for a quarter of an hour, squeezing it now and then. The water may then be added to the bath until it is milky. Bran baths are used in certain diseases of the skin.

52. **Disinfecting Bath.**—(See Appendix, 102).

53. **Foot-Bath.**—A partial bath of this sort is generally given in the form of the hot mustard foot-bath, in the proportion of 1 ounce of mustard (5 level tablespoonfuls) to 1 gallon of water. Fresh hot water must be added from time to time. The foot-bath is an excellent measure when a child has taken cold. Great care must be observed, however, to have the room warm, the bedclothes also warm, and to ensure protection of the rest of the body, including the thighs, when the feet and legs are in the water. A useful plan is to have the tub in the bed, under the covers, while the child lies in bed well covered up, and the sheet is well protected by oilcloth or rubber or by a folded blanket. The bath should last from fifteen to twenty minutes. It is often best to put the child between blankets afterward, as in the case of the warm tub bath.

54. **Wet Compress.**—This form of partial bath consists of a cloth wet with water and kept applied to some part of the body. An ordinary *warm compress* is made by folding a piece of soft cloth or of patent lint into two or three thicknesses, dipping it into tepid water, laying it on the part, covering it with a piece of oil silk or paraffin paper a little larger than the cloth, and gently bandaging it on. It is useful in reducing inflammation, as in cases of sore throat.

A *cold compress* consists of a thin cloth, such as a handkerchief, folded into two or three layers, dipped in cold water or, perhaps, in ice-water, wrung out, and laid on the affected part. Alcohol with twice its volume of ice-water is serviceable for this purpose. The compress is not covered with oil silk, and it must be changed every few minutes, since it rapidly becomes warm. Instead of this method, it may be kept cold by allowing ice-water to drop on it from a vessel higher than the patient. A strip of soft cotton cloth or a skein of darning cotton or a lamp-wick, with one end in the vessel and the other on the compress, will supply enough fresh water. A rubber cloth should be placed under the compress in such a way that the child does not become wet. The cold compress is of service in inflammation, sprains, and the like.

A *hot compress*, or *fomentation*, is made of a piece of flannel folded three or four times into the form of a pad. This is placed in an open towel, dipped into boiling water, wrung out thoroughly by twisting the towel, removed from it, tested by the nurse against her cheek to ascertain that it is not too hot, applied to the part, and covered quickly with oil silk and a folded dry towel, with or without a bandage. The fomentation should be renewed in half an hour if we wish to keep up decided heat. It is often very useful in relieving pain. A poultice is to be preferred, except that it is heavier.

2. Poultices and Plasters.

55. **Poultices.**—The poultice is intended to furnish a dressing which will retain its heat longer than a fomentation. It should be half an inch or less in thickness. The thicker it is the longer it stays warm, but of course the greater its weight. Placed on the chest, it must be thin or its weight will do harm. A poultice should always be tested against the cheek of the nurse before it is applied to the child, and should always be put on slowly. Of the various forms, those made of flaxseed, slippery elm, mush, bread, bran, hops, starch, mustard, and charcoal may be referred to.

56. **Flaxseed Poultice.**—One of the best known and most serviceable kinds. Heat a sufficient quantity of water in a tin or china dish nearly or quite to boiling. Add flaxseed meal slowly, stirring constantly and vigorously with a spoon until it is of the consistence of hot mush, too thick to flow. Spread this with a case-knife upon a piece of cotton or linen cloth; fold the edges over slightly, and cover it with an old pocket-handkerchief or piece of thin muslin, cheese-cloth, or netting. Test to see that it is not too hot; apply, cover with oil silk or paraffin paper, and bandage on. Renew every few hours. The addition of a little oil will keep it soft longer. Everything must be in readiness before the poultice is mixed, or it will grow cold.

57. **Slippery-Elm Poultice.**—Prepared from ground slippery-elm bark in the same way as the flaxseed poultice.

58. **Mush Poultice.**—This is made of corn-meal mush. It has no advantage over the flaxseed poultice.

59. **Bread-and-Milk Poultice.**—A popular and easily-prepared poultice. Stale bread-crumb is stirred into hot milk until the proper consistency is attained. It should be kept hot a few minutes to ensure the bread being well softened, then spread and applied. Water may be used instead of milk.

60. **Bran Poultice.**—When a flaxseed poultice would be too heavy, as in some cases of pain and tenderness in the abdomen, a bran poultice may be used. A flannel bag is partly filled with bran, thoroughly wet with boiling water, wrung out in a towel, and applied.

61. **Hop Poultice.**—Prepared and used exactly as is the bran poultice, over which it has no particular advantage except that it is still lighter.

62. **Starch Poultice.**—Thick boiled starch is spread warm on a cloth and applied directly to the skin without any covering between. It is used to lessen irritation in some affections of the skin.

63. **Mustard Poultice.**—The same as a mustard plaster (Appendix, 69).

64. **Charcoal Poultice.**—This is made from flaxseed meal mixed with an equal quantity of powdered charcoal. More dry charcoal is sprinkled over it after it is spread. It was formerly often used as a dressing for foul-smelling sores and wounds.

65. **Jacket Poultice.**—An application sometimes used for pneumonia. A piece of thin muslin or linen is used, long enough to go entirely around the chest, and wide enough when doubled to extend from the lowest ribs to

the collar bones. The cloth is opened, the hot mass of the poultice spread on one half, the other half folded over it, and the poultice applied as hot as the child can bear it. Oil silk or paraffin paper covers it externally. The poultice should be renewed every few hours, and the new one must always be ready to put on before the old one is taken off. It should be drawn up close under the armpits and toward the collar bones and fastened over the shoulders and at one side with pieces of broad tape. The open edge of the poultice should be above, in order to prevent the contents falling out.

A jacket poultice of bran may be made by constructing a jacket of muslin with a lining of the same sewed to it everywhere except at a single small opening through which the bran can be pushed. The poultice must be quilted to hold the bran in place, soaked in boiling water, pressed out, and applied when of the right temperature. The same poultice can be used again and again.

66. **Antiseptic Poultice.**—For use on open wounds, surgeons favor some form of antiseptic poultice, and object to flaxseed and other varieties already described. One of the best poultices consists of several layers of cheese-cloth or clean soft linen wrung out in a hot antiseptic fluid (Appendix, 79), laid on the wound, covered with paraffin paper, and bound on with a roller bandage. This is in reality a fomentation (Appendix, 54).

67. **Turpentine Stupe.**—A piece of flannel is wrung out in hot water, as in preparing a fomentation, and then sprinkled evenly with turpentine, about half a teaspoonful being used for each square foot of flannel. It is then applied, covered with oil silk and a dry towel, and left on half an hour to an hour, more or less, depending on the degree of irritation it produces.

68. **Spice Plaster.**—This is a very serviceable application for infants with severe colic. It is composed of a mixture of spices which druggists combine in different ways. One formula consists of 1 part each of ground ginger, cloves, cinnamon, and allspice, with or without ⅛ part of Cayenne pepper, according as the plaster is to be strong or weak. Put the dry and well-mixed powder into a flannel bag, spread it evenly, and quilt the bag to prevent the spices from getting into lumps. Before applying, wet it with hot diluted alcohol or hot whiskey. The same spice-bag may be used repeatedly until it begins to lose its strength too greatly.

69. **Mustard Plaster.**—Strictly speaking, this is a poultice, since, as used for children, the mustard is added to flour or flaxseed meal, and the whole moistened and heated: 1 part of mustard should be mixed with 3 or 4, or, in the case of infants, 5, parts of flour or flaxseed meal. Boiling water is added and the mixture stirred until it is of the proper softness. It is then spread on a cloth and applied directly to the skin. If it burns too much, a layer of linen or some other thin material can be placed between. It should be kept on until the skin is well reddened, but not long enough to blister. A plaster less apt to burn the skin is prepared by mixing 1 tablespoonful of mustard, 3 or 4 of flour, the white of one egg, and 1 teaspoonful of glycerin. The prepared mustard leaves sold by the druggists are usually too hot for use with children. They may be employed in emergencies, however, mitigating their strength by covering them with one or two layers of a wet pocket handkerchief.

70. **Pepper Plaster; Nutmeg Plaster.**—These old-fashioned but excellent preparations are of service in mild bronchitis or sore throat. Lard or, still better,

mutton suet is spread evenly on a cloth and black pepper or powdered nutmeg dusted rather thickly over it. Red pepper may be used instead, but in smaller amount. The plaster may be worn for days over the chest or around the throat. Another plaster is made by mixing a very little Cayenne pepper in a thin paste of flour and water or in vaseline and applying on a thin cloth.

71. **Cotton Jacket.**—This is sometimes ordered by physicians in cases of pneumonia. A muslin waist should be fitted to the chest, reaching high in front and behind, and tying or pinning over the shoulders and down one side under the arm. To the inside of this a thick layer of cotton batting is loosely attached. If it is desired to retain the perspiration and keep the skin moist, a layer of oil silk is sewed outside of the muslin, or the cotton may be sewed directly to the oil silk, cut in the shape of a waist.

3. Ointments.

72. **Bismuth-and-Zinc Ointment.**

Subnitrate of bismuth,	30 grains;
Oxide of zinc,	30 "
Lanolin,	½ ounce;
Vaseline,	½ "

73. **Ointment for Ringworm.**

Sulphur,	½ drachm;
Tar ointment,	1 "
Benzoated lard,	1 ounce.

To be well rubbed in two or three times a day.

74. **Boric-Acid Ointment.**

Boric acid,	1 drachm;
Vaseline,	1 ounce;

75. **Boric-Acid-and-Zinc Ointment.**

Boric acid,	½ drachm;
Oxide of zinc,	½ "
Lanolin,	½ ounce;
Vaseline,	½ "

4. Solutions and Mixtures.

76. **Carbolized Oil.**

Pure carbolic acid (Calvert's No. 1),	½ drachm;
Finest olive oil,	2 fluidounces.

This should be marked "Poison!" (See remarks in Appendix, 81.)

77. **Tannic-Acid-and-Glycerin Nipple Lotion.**

Glycerite of tannic acid,	1 fluidounce;
Water,	1 "

To be painted upon the nipple and allowed to remain.

78. **Bismuth Nipple Lotion.**

Subnitrate of bismuth,	1 ounce;
Castor oil,	1 fluidounce.

To be used as the preceding.

79. **Boric-Acid Lotion.**

Boric acid,	½ ounce;
Water,	1 pint.

To be used as an antiseptic wash in dressing wounds.

80. **Boric-Salicylic-Acid Lotion.**

Boric acid,	50 grains;
Salicylic acid,	8 "
Water,	8 ounces.

Used as an antiseptic lotion in cases of burns.

81. **Carbolic-Acid Lotion.**

Pure carbolic acid (Calvert's, No. 1),	½ drachm;
Water,	6 fluidounces.

To be used as the preceding. To be marked "Poison!"

Solutions of carbolic acid should never be applied by a mother to any but small areas of skin, whether there are open wounds or not, as poisoning by absorption has repeatedly occurred.

82. **Corrosive-Sublimate Antiseptic Lotion.**

Corrosive sublimate,	1¼ grains;
Tartaric acid,	6¼ "
Distilled water,	8 fluidounces.

To be used and marked as the preceding. Injurious to metal.

A more convenient method of preparing it is to dissolve in 3 pints of water one of the sublimate tablets which are for sale by druggists. Either method makes a solution of the strength of 1 of sublimate in 3000 of water.

83. **Starch-and-Boric-Acid Lotion.**—Starch is to be dissolved in the boric-acid solution (No. 79) in the same way as when preparing ordinary starch-water (No. 47).

84. **Boric-Acid-and-Glycerin Lotion.**

Boric acid,	20 grains;
Tincture of myrrh,	½ fluidrachm;
Glycerin,	1 "
Water, enough to make	1 fluidounce.

Apply frequently to the inside of the mouth for inflammation or thrush.

85. **Eye Lotion.**

Boric acid,	20 grains;
Camphor-water,	2 fluidounces.

86. **Astringent Gargle.**

Tannic acid,	1 heaping teaspoonful;
Water,	1 tumblerful.

Dissolve and use as a gargle.

87. **Tannic-Acid Solution for Nose-bleed.**

Tannic acid,	2 drachms;
Glycerin,	1 fluidrachm;
Water,	2 fluidounces.

To be injected or snuffed into the nose in obstinate cases of nose-bleed.

88. **Alum Lotion.**

Alum,	6 drachms;
Water,	8 fluidounces;
Alcohol,	8 "

To be used as a wash in excessive perspiration or if bed-sores are threatening.

89. **Cooling Lotion.**

Pure carbolic acid (Calvert's No. 1),	40 grains;
Ether,	2 fluidrachms;
Alcohol,	6 fluidounces.

To be dabbed on the parts and let dry. To be marked "Poison!" (See remarks in Appendix, 81.)

90. **Lotion for Freckles. No. 1.**

Compound tincture of benzoin,	1 fluidrachm;
Glycerin,	½ fluidrachm;
Rose-water,	3 fluidounces.

91. **Lotion for Freckles. No. 2.**

Borax,	1 drachm;
Dilute acetic acid,	½ fluidounce;
Rose-water,	½ fluidounce.

92. **Injection for Convulsions.**

Bromide of potash,	10 grains;
Hydrate of chloral,	3 "
Milk of asafœtida,	2 fluidounces.

One or two tablespoonfuls as an injection for an infant. To be repeated in half an hour if needed.

93. **Injection for Seat-worms.**

Quassia-chips,	1 ounce (1 small teacupful);
Water,	1 pint.

Let soak for two or three hours. Inject slowly as much as the child will contain.

5. POWDERS.

94. **Compound Camphor Powder.**

Camphor,	1 drachm;
Oxide of zinc,	½ ounce;
Starch,	½ ounce.

Make into a very fine powder.

95. **Boric-Acid-and-Zinc Powder.**

Boric acid,	½ ounce;
Oxide of zinc,	½ ounce.

Make into a very fine powder.

96. **Bismuth-and-Zinc Powder.**

Subnitrate of bismuth,	½ ounce;
Oxide of zinc,	½ ounce.

Make into a very fine powder.

6. Disinfectants.

97. Carbolic Acid.

Carbolic acid (Calvert's No. 4),	6½ ounces;
Glycerin,	4 fluidounces;
Water,	1 gallon.

This forms a 5 per cent. solution suitable for disinfecting dishes, clothing, thermometers, metal work, and the hands of the nurse. Clothes should be soaked in it for several hours, then wrung out, carried away in a covered bucket, and boiled thoroughly. It may be used also to wet the sheet hung at the door. It is more convenient to have the druggist prepare a very concentrated solution of carbolic acid, with directions how much water shall be added to make a 5 per cent. solution.

98. Chloride of Lime.

Chloride of lime,	4 ounces;
Water (soft),	1 gallon.

A pint or a quart of this is to be thoroughly mixed with the passages from the bowels of typhoid-fever cases, covered, and allowed to stand for three hours before emptying. The solution may also be used to mix with any infectious expectorated or vomited matter.

99. Chlorinated Soda.

Solution of chlorinated soda,	6 fluidounces;
Water, enough to make	1 quart.

Useful for disinfecting the hands, eating utensils (except silver), etc., but not so suitable for clothing as No. 97. It may be used to wet the sheet in front of the door.

100. Corrosive-Sublimate Solution, No. 1.

Corrosive sublimate,	2 ounces;
Tartaric acid,	24 "
Carminate of soda,	8 grains;
Water,	1 quart.

This is the formula of the Paris disinfecting service; 4 ounces mixed with 1 gallon of water makes a solution of the strength of 1 part of the sublimate in 500 of water. The blue carminate of soda is added to give a slight color, so that the poisonous nature of the solution may be easily recognized. The solution is suitable for disinfecting floors, wood-work, leather, rubber, etc. It must not be used upon metal. Clothing may be disinfected by immersing it for two hours in a mixture of ½ ounce of the stock solution and 1 gallon of water. There is some danger, however, of its becoming stained by the carminate of soda. The sheet in front of the door of the room may be moistened with a mixture of 2 ounces of the stock solution and 1 gallon of water.

101. **Corrosive-Sublimate Solution, No. 2.**—One of the sublimate tablets referred to in No. 82, dissolved in 1 pint of water, makes a solution of the strength of 1 part in 1000. This is by far the most convenient method of preparing the sublimate solution for disinfecting purposes.

102. **Disinfectant Bath.**—The solution No. 101, diluted with 9 parts of water, gives a strength of 1 in 10,000. This may be used either for sponging or for immersion of the body as a final procedure after recovery from infectious diseases. After drying, the child is removed into another room and dressed in clothing which has not been near the sick-room.

103. **Disinfectant Vapor.**

Pure carbolic acid,	1 ounce;
Oil of eucalyptus,	1 fluidounce;
Turpentine,	8 fluidounces.

Two tablespoonfuls may be poured on a quart of water in

a shallow pan, and this kept constantly simmering in the room of a diphtheritic patient, for the purpose of moistening and disinfecting the air. Fresh solution must be added from time to time. The flame must be kept well away from the liquid.

104. **Dry Disinfectants.**—Dry copperas (sulphate of iron) or chloride of lime may be placed in large amounts in water-closets, water-pipes, cesspools, and the like, for the purpose of disinfecting them.

III. Remedies for Internal Administration.

105. **Soda-Mint.**

Bicarbonate of soda,	½ drachm;
Aromatic spirits of ammonia,	½ fluidrachm;
Spearmint-water, enough to make	2 fluidounces.

A teaspoonful in hot water at one year of age.

106. **Laxative Alkaline Mixture.**

Bicarbonate of soda,	½ drachm;
Spiced syrup of rhubarb,	4 fluidrachms;
Syrup of senna,	4 "
Syrup of orange,	1 fluidounce.

A teaspoonful, more or less, three times a day at one year of age, depending upon the intensity of its action.

107. **Chalk-and-Bismuth Mixture.**

Subnitrate of bismuth,	1½ drachms;
Chalk mixture,	2 fluidounces.

A teaspoonful every three hours or oftener at one year of age. A younger child requires a dose not much smaller than this.

108. **Fever Mixture.**

Sweet spirits of nitre,	1½ fluidrachms;
Citrate of potash,	30 grains;
Syrup of lemon,	4 fluidrachms;
Water, enough to make	2 fluidounces.

A teaspoonful every three hours at one year of age.

109. **Croup Mixture.**

Syrup of ipecacuanha,	2½ fluidrachms;
Bromide of potash,	½ drachm;
Cinnamon-water,	13½ fluidrachms.

A teaspoonful every hour or two for three or four doses at two years of age.

110. **Jeaunel's General Antidote for Poisoning.**

(*a*)	Calcined magnesia,	2 ounces;
	Animal charcoal,	1 ounce;
	Water,	20 fluidounces.
(*b*)	Monsel's solution of iron,	2 fluidounces.

When needed, the two solutions should be mixed together, shaken hard, and given two tablespoonfuls at a time, repeated very frequently.

111. **Emetics.**

A teaspoonful or more of syrup of ipecacuanha, repeated in fifteen minutes.

A glass of warm water with as much common salt as it will dissolve.

A half teaspoonful of alum stirred up in syrup or in molasses.

A teaspoonful of mustard in a large quantity of warm water, if other emetics fail.

IV. MISCELLANEOUS.

112. **Massage.**—This is a procedure which no one is capable of carrying out as it should be done unless trained well and long in both its theory and its practice. Still, where a skilled masseuse cannot be obtained, the mother or nurse can perhaps do something, and it is certainly worth the trial; but it should be attempted only under the advice and direction of the physician, who can at least give some idea as to what he desires and the method of procedure, even though he be no adept himself.

Massage often does more good in cases of paralysis than any other plan of treatment. Children suffering from general debility or from chronic catarrhal conditions of the stomach and bowels are often aided greatly by it. Constipation and colic in babies are frequently much relieved by rubbing and kneading the abdomen, provided this is done in the proper way (p. 274). There are, indeed, many conditions in which massage finds a useful sphere.

There are various technical terms used to designate the different manipulations. Prominent among these are *effleurage* (stroking), *friction* (rubbing), *pétrissage* (kneading), and *tapotement* (tapping). The method of performing each of these and the conditions in which they are specially useful is far too large a subject for consideration in a book of this nature, even were it profitable to speak further of a matter for which actual demonstration is the only satisfactory explanation.

113. **Table of Approximate Equivalent Measures.**—The following table shows the relative value of drops, teaspoonfuls, fluidrachms, fluidounces, etc.:

1 minim (♏j)	. . . . .	= 1 drop water, or 2 drops tinctures, spirits, or wines.	
30 minims	= ½ fluidrachm (fℨss)	= 1 coffeespoonful.	
60 "	= 1 " (fℨj)	= 1 teaspoonful.	
2 fluidrachms	. . . . .	= 2 teaspoonfuls	= 1 dessertspoonful.
4 "	= ½ fluidounce (fℨss)	= 4 "	= 1 tablespoonful.
8 "	= 1 " (fℨj)	= 2 tablespoonfuls.	
2 fluidounces	. . . . .	= 4 "	= 1 wineglassful.
8 "	= ½ pint (Oss)	. . . = 1 tumblerful.	
16 "	= 1 " (Oj).		
32 "	= 2 pints	. . . . . = 1 quart.	
8 pints . .	= 4 quarts	. . . . . = 1 gallon (Cj).	

For measuring minims we ought to have one of the small minim glasses sold by druggists (Fig. 96). Very commonly medicines are given by drops instead of minims. In such a case we must never forget that the drop is of a very variable size, depending upon both the nature of the liquid and the nature of the article from which the drop falls. To be exact we should purchase an *accurate* medicine-dropper (Fig. 97), and have the druggist test it, no matter how reliable it is claimed to be. An accurate dropper will give 60 drops of water to the fluidrachm; that is, 1 drop equals 1 minim. Alcoholic solutions, however, such as most of the tinctures and spirits, and whiskey and other stimulants, drop about 120 drops to the fluidrachm; that is, 2 drops equal 1 minim. Consequently, if the physician orders a drop of laudanum, and the mother uses the minim glass, she must measure

FIG. 96.—Minim glass (natural size).

out only half a minim. This difference which sometimes exists between the drop and the minim is a matter of the

FIG. 97.—Medicine dropper.

very greatest importance. If the accurate dropper is not available, the medicine should be dropped from the edge

FIG. 98.—Method of dropping from the edge of the bottle.

of the bottle, with the cork half covering the opening (Fig. 98). The dropper with very narrow pointed ends, so commonly sold, is useless for the purpose, as the drop is too small. Should half a drop of a liquid be ordered by the physician, 1 drop may be mixed with 2 teaspoonfuls of water and 1 teaspoonful of this given. For measuring larger doses teaspoons and tablespoons are very unsatisfactory, since they vary so much in size. The ordinary measuring glasses, although much better, are also inaccurate. It is much wiser to purchase a two-ounce glass graduate (Fig. 99) from the druggist.

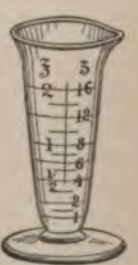


FIG. 99.—Two-ounce glass graduate.

114. **Table of Proportionate Dosage at Different Ages.**—The size of a dose varies, first, with the age of the child; second, with its size; third, with the nature of the disease; fourth, with the individual medicine. There can, indeed, be no absolute rule, and there are numerous exceptions; for children bear some drugs in proportionately much larger doses than adults do, while certain others they can take in only the minutest quantities. As a rule, the actual age is not so much the basis of calculation as *that age to which the length and weight of the child correspond.*

The following table forms a general guide for the different periods of life:

Adult	1	
18 years	$\frac{3}{4}$ or 1	
12 "	$\frac{1}{2}$	
8 to 10 years	$\frac{2}{5}$	
6 years	$\frac{1}{3}$	
4 years	$\frac{1}{4}$	
3 "	$\frac{1}{5}$	
2 "	$\frac{1}{7}$	
1 year	$\frac{1}{10}$	
9 months	$\frac{1}{15}$ = $\frac{2}{3}$	dose of 1 year.
6 "	$\frac{1}{20}$ = $\frac{1}{2}$	" 1 "
Birth to 3 months	$\frac{1}{30}$ = $\frac{1}{3}$	" 1 "

115. **Dose List for Children One Year Old.**—According to the previous table (No. 114), the dose at 2 years is approximately one and a half times, at 3 years twice, at 6 years three times, at 8 to 10 years four times the amounts given below, while the doses at less than 1 year may likewise be determined by consulting the same table. As has been frequently stated elsewhere in this book, no mother should attempt to prescribe for her child, especially with powerful drugs, such as some of these in the following list are. This list is given solely for the information of trained nurses—which they must not put into practice unless forced to do so—and for the sake of

that general knowledge which never comes amiss, and which may prove useful in cases of great emergency where a physician cannot be found. It is especially to be remembered that opium is the drug to which children are particularly susceptible. Remember, too, the difference between drops and minims. (See page 418.) The frequency with which doses of the remedies should be repeated is purposely omitted, since it depends absolutely upon the necessities of the case, and can be determined only by a physician.

Acetanilid	gr. ¼ to ½.
Aconite, tincture	♏ ⅛ to ¼.
Ammonia, aromatic spirits of	♏ 2 to 4.
Antipyrin	gr. ¼ to ½.
Asafœtida, milk of	♏ 15 to 60.
Belladonna, tincture	♏ ½ to 1.
Bismuth, subnitrate	gr. 5 to 8.
Brandy (see *Stimulants*).	
Bromide of potash or soda	gr. 1 to 4.
Calomel	gr. $\frac{1}{24}$ to $\frac{1}{12}$ (½ in a single dose).
Cascara (tasteless preparation)	♏ 4 to 30.
Cascara, fluid extract	♏ 1 to 4
Castor oil	ʒ ½ to 1.
Catechu, tincture	♏ 5.
Cinnamon-water	ʒ ½ to 1.
Chalk mixture	ʒ ¼ to 1.
Chloral	gr. ½ to 2.
Chlorate of potash	gr. 1.
Citrate of magnesia (see *Magnesia*).	
Citrate of potash	gr. 1 to 2.
Cod-liver oil	ʒ ¼ to 1.
Digitalis, tincture	♏ ½ to 1.
Dover's powder	gr. ⅛ to ½.
Epsom salts (see *Magnesia sulphate*).	
Fowler's solution of arsenic	♏ ¼ to 1.
Gin (see *Stimulants*).	
Ginger, tincture	♏ 1 to 5.
Hoffmann's anodyne	♏ 1 to 5.

Hydrochloric acid, dilute	♏ 1 to 2.
Iodide of potash	gr. ¼ to 1.
Ipecacuanha, syrup or wine	♏ 1 to 5.
Iron, citrate	gr. ¼ to 1.
Iron, reduced	gr. ¼ to ½.
Iron, syrup of iodide	♏ 1 to 3.
Iron, tincture of chloride	♏ ½ to 2.
Kino, tincture	♏ 5.
Laudanum. [A tincture]	♏ ½ to ½.
Liquorice powder	gr. 2 to 4.
Magnesia	gr. 5 to 20.
Magnesia, citrate (liquid)	ʒ 1 to 4.
Magnesia, sulphate	gr. 3 to 10.
Malt extract	♏ 10 to 15.
Manna	gr. 5 to 30
Morphine	gr. $\frac{1}{60}$ to $\frac{1}{100}$.
Nitre, sweet spirits of	♏ 2 to 6.
Nux vomica, tincture	♏ ½ to 1.
Olive oil	ʒ ½ to 1.
Pancreatic extract	gr. 3 to 5.
Paregoric. [A tincture]	♏ 3 to 10.
Peppermint-water	ʒ ½ to 1.
Pepsin	gr. ½ to 2.
Phenacetin	gr. ¼ to ½.
Quinine	gr. ½ to 1.
Rhubarb, syrup of	ʒ ½ to ½.
Salicylate of soda	gr. ½ to 1.
Senna	gr. 1 to 4.
Senna, syrup	♏ 10 to 15.
Soda, bicarbonate	gr. 1 to 2.
Soda, phosphate	gr. 5 to 20.
Spearmint-water	ʒ ½ to 1.
Squills, syrup	♏ 1 to 5.
Stimulants:	
Brandy	♏ 5 to 30.
Gin	♏ 5 to 30.
Port wine	♏ 5 to 30.
Sherry	♏ 5 to 30.
Whiskey	♏ 5 to 30.
Sulphuric acid, dilute	♏ ½ to 4.
Tannic acid	gr. ½ to 2.

Whiskey (see *Stimulants*).

Wine (see *Stimulants*)

116. **Medicine Closet.**—The contents of the medicine closet, to which reference was made in Chapter X., p. 234, should be somewhat according to the following list. This contains, among other things, articles useful for accidents, including poisoning. The list may be curtailed in some respects, but suffers consequently in completeness. Those liquids marked with an * are for external use or are dangerous. They should be in poison-bottles.

LIST OF ARTICLES FOR MEDICINE CLOSET.

Glass graduate marked with fluidrachms and fluid-ounces; minim glass; accurate dropper; hard-rubber syringe holding four or six ounces; small druggist's hand scales for weighing medicines; camel's-hair brushes; small straight dressing-forceps; a pair of scissors; absorbent cotton; several one-inch and two-inch roller bandages, one to three yards long; patent lint; old linen; a spool of rubber adhesive plaster; court plaster; paraffin paper or oil silk; *alcohol; whiskey; olive oil; *ammonia-water; *turpentine; glycerin; *distilled fluid extract of hamamelis (witch-hazel) for bruises; *soap liniment for sprains; *tincture of iodine; *solution of boric acid for washing cuts (Appendix, 79); flaxseed meal; mustard; magnesia; vaseline; castor oil; zinc ointment; soda-mint; baking soda; sweet spirits of nitre; aromatic spirits of ammonia; bromide of potash in 20-grain powders, to be divided according to the age; *tincture of digitalis; syrup of ipecacuanha; tannic acid for use in poisoning; Epsom salts for poisoning; vinegar for poisoning; sulphate of copper in 3-grain powders, for poisoning by matches; Jeaunel's antidote for poisoning.

SECOND APPENDIX.

THIS Second Appendix contains a fuller description of some of the principles of infant feeding than has been given in the preceding pages of the volume. Although it is of a somewhat technical nature I have tried to make it easily comprehensible. The reason for inserting it is explained in the Preface. As there, I would urge upon mothers the entire avoidance of the responsibility of the selection of an infant's diet. It should be borne by the physician. Only mothers without medical aid need consult what follows.

We may divide the subject into: I. The General Principles Governing the Feeding of a Healthy Infant. II. The Food-mixtures to be Employed. III. The Modification of the Method if Indigestion Develops.

I. THE GENERAL PRINCIPLES GOVERNING THE FEEDING OF A HEALTHY INFANT.

To an infant unfortunately deprived of natural food an artificial mixture must be given. This is generally based upon the composition of average human milk as given on page 137. The unavoidable differences between the substances composing cow's milk and human milk respectively have already been alluded to. The casein of cow's milk, according to different well-recognized authorities, is several times as abundant as the lactalbumin, while in human milk the casein is but little in excess or even less than the lactalbumin. A dilution of cow's milk to pro-

duce a total proteid percentage equaling that of human milk will still, therefore, leave the casein higher than it should be. The fat of cow's milk contains an excess of volatile fatty acids, such as butyric, as compared with human milk. It is such acids which produce the well-known rancid odor which sour-smelling babies often have. There are a number of other differences between the two milks, shown in the nature of the ferments and other little-understood bodies present.

These various differences make it inadvisable to begin feeding a baby with a cow's milk mixture the gross percentage composition of which is the same as that of human milk. Thus a mixture which contains 4 per cent. of fat, 7 per cent. of sugar, and 1 to 1.5 per cent. of proteids, as in human milk, given to an infant two or three weeks of age would almost certainly disagree with it. It is best always to commence with percentages lower than these. A food containing 2 per cent. of fat, 5 per cent. of sugar, and 0.5 per cent. of proteids would be a suitable beginning.

Should the formula suggested agree, it will be necessary to raise the percentages in a few days, since they are not of a nature sufficiently strong to nourish an infant for any length of time. The general health of the baby and its weight, taken every second day, will be the chief guides at this and at later periods in determining whether or not a child is getting food sufficiently strong or sufficiently large in amount. Of course, a falling off in weight on *one day* is not the criterion. It is the general course of the weight during a series of days which is to be the guide.

After a few days of the first weak percentage formula the proteids can readily be made 0.75 per cent. and then 1 per cent. Less than 1 per cent. of proteid will rarely be

found sufficient for nourishment. Should these percentages be well digested, the fat can be increased to 2.5 or 3 per cent. and the sugar to 6 or 7 per cent. On a mixture of 3 per cent. fat, 6 or 7 per cent. sugar, and 1 to 1.5 per cent. proteids many infants will thrive for months. Others soon need a higher percentage of proteids, and 2 per cent. may be tried. Infants up to the age of six or even nine months rarely require a stronger mixture than this, except that in the case of those who are particularly free from sour-smelling regurgitation the fat may often be increased to 3.5 or even 4 per cent. and the proteids in the latter part of the first year may often be raised to 2.5 per cent.

Human milk does not vary materially in percentage composition during all the nursing period, and the infant consequently receives no increase in the percentages of the ingredients. With cow's milk mixtures, however, an increase in the percentage of proteids is often required, although not always so. The reason for this need probably depends upon the different chemical compositions alluded to and the fact that the proteids of cow's milk are not completely utilized in the infant's intestine.

The rapidity, however, with which the changes in the mixture may or must be made can be governed by no absolute rule. The weight and general condition of the child must be our guide rather than the age. I believe it a mistake to regard a mixture of a certain strength as the one which should be considered suitable for a certain age. Only three or four days should elapse between the use of Formula 1 and Formula 2 (p. 430), as a decided decrease in weight will otherwise occur. A week, perhaps, may pass, and then Formula 6 (p. 431) may be given, and then, in a week or two more, Formula 8 (p. 432). After this the rapidity of progress depends upon the needs of the

infant, and no change at all may be required for months. Generally the fat should not be made greater, but the proteid increased to 1.25 or 1.5 per cent. It is a wise plan not to hurry, otherwise indigestion may readily develop, and it is far easier to keep the baby well than to get it well again if once sick. I have seen much damage follow a too hasty advance of the strength of the food, the result of a mother's anxiety to have her child grow rapidly.

Should the baby seem suited with its mixture, yet not gaining rapidly enough, the *amount* of the food given can better be increased first and the *strength* later. The rules laid down on page 134 for the amount proper at different ages are, as stated there, not absolute. If a baby is apparently digesting well, yet unsatisfied and not gaining, the amount may be decidedly increased beyond the figures given.

It may be of service in this connection to explain that the action of the food upon the infant is, first, the building up of tissue and, second, the maintaining of the heat of the body. Proteids are absolutely essential to the building of tissue since they alone contain nitrogen, but they cannot by themselves maintain the requisite heat. Fat is by far the best heat producer, with the sugar coming next, and the proteids last. Both fat and sugar are, to a limited extent, tissue builders, although not necessary for this. All three ingredients are required in the food, although as heat producers one can be replaced by another to a certain degree.

II. THE FOOD-MIXTURES TO BE EMPLOYED.

Cow's milk from the general herd runs fairly uniform in the percentages of proteids and sugar. That of the fat, however, is decidedly variable. This applies still more to the cream, and renders the preparation of mix-

tures difficult and uncertain. In some of the larger cities a cream of known percentage in fat can be obtained, but in such cases physicians also abound and the mother does not need to concern herself about the selection of the food. On this account we may confine ourselves to the discussion of the preparation of what are called "Top-milk Mixtures."

A quart jar of milk as it is usually delivered generally has the cream layer already well separated. If it has not, it should be stood—*i. e.*, "set"—on ice for six hours, by which time nearly all the cream will have risen to the top. If the milk is sold from the can, the mother should at once pour it into a quart milk jar, such as dairies employ, and set it as described.

The strength in fat of the cream and of the milk immediately below it varies with the season and with the richness of the whole milk employed, as also, to some extent, with the breed of cows. Nevertheless, it is fairly accurate for practical purposes, except that it is better not to use the milk from Jersey cattle if it can be avoided, as this is often so rich in fat that all mixtures made according to ordinary formulæ are far too strong.

Ordinarily, we may assume that the upper portion—*i. e.*, the "top-milk"—of a quart of milk set in the way described contains fat in the following proportions:

Upper	4	ounces	contain	20	per cent. fat.
Upper	6	"	"	16	" "
Upper	8	"	"	12	" "
Upper	10	"	"	11	" "
Upper	12	"	"	9	" "
Upper	14	"	"	8	" "
Upper	16	"	"	7	" "
Upper	20	"	"	6	" "
Upper	25	"	"	5	" "

The lower 16 ounces of the jar contain an amount of fat so small that it may be ignored for practical purposes.

We may make any mixture from certain amounts of the top-milk and of the bottom-milk respectively. The former supplies fat, sugar, and proteids, the latter only sugar and proteids. The following formulæ give approximations of the percentages obtained with the various amounts used. It is not intended that the infant shall be advanced from one to the next in the order in which they are printed:

Formula 1.—Fat, 2 per cent.; Sugar, 6 per cent.; Proteids, 0.5 per cent.

Of upper 8 ounces	take	3¼	ounces.
Of lower 8 "	"	0	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	1	"
Of water	"	15¾	ounces.

Formula 2.—Fat, 2 per cent.; Sugar, 6 per cent.; Proteids, 0.75 per cent.

Of upper 8 ounces	take	3¼	ounces.
Of lower 8 "	"	1½	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	1	"
Of water	"	14¼	ounces.

Formula 3.—Fat, 2 per cent.; Sugar, 6 per cent.; Proteids, 1 per cent.

Of upper 8 ounces	take	3¼	ounces.
Of lower 8 "	"	2½	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	1	"
Of water	"	13¼	ounces.

Formula 4.—Fat, 2 per cent.; Sugar, 6 per cent.; Proteids, 1.5 per cent.

Of upper 8 ounces	take	3¼ ounces.
Of lower 8 "	"	5¼ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	1 "
Of water	"	10½ ounces.

Formula 5.—Fat, 2 per cent.; Sugar, 6 per cent.; Proteids, 2 per cent.

Of upper 8 ounces	take	3¼ ounces.
Of lower 8 "	"	8¼ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	¾ "
Of water	"	7½ ounces.

Formula 6.—Fat, 2.5 per cent.; Sugar, 6 per cent.; Proteids, 1 per cent.

Of upper 8 ounces	take	4¼ ounces.
Of lower 8 "	"	1¾ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	1 "
Of water	"	13 ounces.

Formula 7.—Fat, 2.5 per cent.; Sugar, 6 per cent.; Proteids, 1.5 per cent.

Of upper 8 ounces	take	4¼ ounces.
Of lower 8 "	"	4¼ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	1 "
Of water	"	10½ ounces.

Formula 8.—Fat, 3 per cent.; Sugar, 6 per cent.; Proteids, 1 per cent.

Of upper 8 ounces	take	5 ounces.
Of lower 8 "	"	1 ounce.
Of lime-water	"	1 "
Of milk-sugar	"	1 "
Of water	"	13 ounces.

Formula 9.—Fat, 3 per cent.; Sugar, 6 per cent.; Proteids, 1.5 per cent.

Of upper 8 ounces	take	5 ounces.
Of lower 8 "	"	3½ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	1 "
Of water	"	10½ ounces.

Formula 10.—Fat, 3 per cent.; Sugar, 6 per cent.; Proteids, 2 per cent.

Of upper 8 ounces	take	5 ounces.
Of lower 8 "	"	6½ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	¾ "
Of water	"	7½ ounces.

Formula 11.—Fat, 3 per cent.; Sugar, 6 per cent.; Proteids, 2.5 per cent.

Of upper 8 ounces	take	5 ounces.
Of lower 16 "	"	9¼ "
Of lime-water	"	1 ounce.
Of milk-sugar	"	¾ "
Of water	"	4¾ ounces.

Formula 12.—Fat, 3.5 per cent.; Sugar, 6 per cent.; Proteids, 1.5 per cent.

Of upper 8 ounces	take	5¾	ounces.
Of lower 8 "	"	3¼	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	1	"
Of water	"	10	ounces.

Formula 13.—Fat, 3.5 per cent.; Sugar, 6 per cent.; Proteids, 2.5 per cent.

Of upper 8 ounces	take	5¾	ounces.
Of lower 16 "	"	8½	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	¾	"
Of water	"	4¾	ounces.

Formula 14.—Fat, 3 per cent.; Sugar, 6 per cent.; Proteids, 3 per cent.

Of upper 8 ounces	take	5	ounces.
Of lower 16 "	"	12¼	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	⅗	"
Of water	"	1¾	ounces.

Formula 15.—Fat, 3.5 per cent.; Sugar, 6 per cent.; Proteids, 3 per cent.

Of upper 8 ounces	take	5¾	ounces.
Of lower 8 "	"	11½	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	⅗	"
Of water	"	1¾	ounces.

Formula 16.—Fat, 4 per cent.; Sugar, 6 per cent.; Proteids, 2 per cent.

Of upper 8 ounces	take	6¾	ounces.
Of lower 8 "	"	4¾	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	¾	"
Of water	"	7½	ounces.

Formula 17.—Fat, 4 per cent.; Sugar, 6 per cent.; Proteids, 3 per cent.

Of upper 8 ounces	take	6¾	ounces.
Of lower 16 "	"	10½	"
Of lime-water	"	1	ounce.
Of milk-sugar	"	⅜	"
Of water	"	1¾	ounces.

It must always be remembered to dip off with the Chapin dipper (p. 145) the *entire* upper 8 ounces mentioned in these formulæ, and then to take of this the number of ounces called for. If more than 8 ounces are needed, two quart jars must be set and 8 ounces dipped from each. To dip off less or more than the 8 ounces will, of course, modify the strength of the mixture decidedly. Dipping the upper 4 ounces from a pint of milk gives nearly the same strength top-milk as the upper 8 ounces from a quart. There is, however, a difference, and the use of the quart jar is to be preferred.

The sugar may be measured in one of the sugar measures described on p. 144, according to the directions there given. In preparing the mixture the most accurate method is to add the sugar to a portion of the water to be used, raise this to boiling for a moment, cool, strain if necessary, and then add enough water to make up the total number of ounces of water called for by the formula.

The lime-water, top-milk, and bottom-milk are then added. The proper amount of food is then placed in each bottle, mixing enough for the entire twenty-four hours' feeding. To add the sugar directly to the total number of ounces of water increases the volume of the fluid somewhat beyond that called for.

All the formulæ given above are based upon a 20-ounce mixture. If it is desired to prepare 25 ounces, each ingredient is multiplied by 1.25; if 30 ounces, by 1.5; if 40 ounces, by 2; if 45 ounces, by 2.25, and so on.

It will be noticed that none of the formulæ contain more than 6 per cent. of milk-sugar. This is generally found sufficient. If, however, it seems advisable to increase the heat-producing quality of the food by raising the sugar to 7 per cent., this may readily be done by adding $\frac{2}{3}$ of an ounce of milk-sugar to each 20 ounces of mixture. To make it 5 per cent., use $\frac{2}{3}$ of an ounce less.

Generally, 5 per cent. of lime-water added to the mixture—*i. e.*, 1 ounce in the 20 ounces—is sufficient. When there is an unusual amount of sour regurgitation the lime-water can perfectly well be increased to 10 per cent. —*i. e.*, 2 ounces. The amount of plain water must then be made 1 ounce less.

Of course, other strengths of top-milk may be employed instead of the upper 8 ounces, but amounts of these and of bottom-milk are then required different from those given in the formulæ. A little calculation will easily enable one to prepare foods in this way. For instance, since whole milk contains 4 per cent. of fat and nearly 4 per cent. of proteids, it is evident that if we make a mixture half milk and half water we shall obtain a food containing 2 per cent. of fat and 2 per cent. of proteids, as in Formula 5 (p. 431). The sugar also is reduced, however,

by the dilution to about 2 per cent. We must add, then, 4 per cent. more of sugar to bring this up to the 6 per cent. of the formula—*i. e.*, ½ of an ounce, this being 4 per cent. of 20 ounces.

Again, the upper 16 ounces of the quart contain about twice as much fat (7 to 8 per cent.) as proteids (3.6 to 4 per cent.). We could, therefore, with this and a sufficient amount of water prepare any of the formulæ I have given in which the fat and the proteids bear the relation of 2 to 1 to each other. Formula 3 (p. 430), for instance, would be prepared by mixing 1 part of the upper 16 ounces with 3 parts of water. This would reduce the sugar present to 1 per cent., and 5 per cent. of 20 ounces—*i. e.*, 1 ounce—of sugar would need to be added to bring it up to the 6 per cent. of the formula.

However, the inclusion here of other formulæ would only complicate the matter unnecessarily, and we can very well limit ourselves to the upper 8 ounces in our preparations.

A very convenient apparatus has been devised[1] for making modified milk mixtures. It consists of a 16-ounce glass graduate, upon which are marked the proper amounts of top-milk, water, etc., to be used to produce almost any percentage formula. It can be highly recommended.

III. The Modification of the Method of Feeding if Indigestion Develops.

The first rule of action, should indigestion develop, is to reduce the strength and the amount of the food at once. Should the indigestion be acute and severe, and especially if repeated vomiting is occurring, the milk mixture must

[1] This apparatus is manufactured by the Cerco Company, Tappan, N. Y., and retails for $1.50.

be stopped absolutely for from twenty-four to forty-eight hours or, occasionally, longer. In the meantime the baby may be given barley-water (Appendix, 30) or egg-water (Appendix, 1). The latter is more nourishing, the former rather more digestible; either may be sweetened if the infant refuses it without. The advantage of these substances is that neither contain either fat or casein. When a milk mixture is recommenced a weak one is chosen, and this rapidly increased in strength, if good digestion continues, to the one on which the child was thriving best.

Yet we must not be influenced by too great a caution. It does not follow because, for instance, curds are always present in the stools in infants appearing otherwise perfectly well, or because sour vomiting occasionally takes place that the strength of the food must necessarily be reduced. Many babies will not gain on a food which is not attended by some small curds constantly present in the passages. Should the number of the white masses in the stools be decidedly large, it may be well to let barley-water replace one-half or more of the water used in the mixture. This sometimes is effectual by mixing with the ingredients of the food and probably by mechanically interfering with the union of the casein into such large firm masses. If this does not avail, it may be necessary to reduce the amount of the proteid matter of the milk still further. It is here that peptonizing of the milk is often so effective. In this process the casein is acted upon by the extract of pancreas and so altered that it cannot be curdled by the rennet of the stomach, although it may still be coagulated by any acid present. It is frequently of great benefit, but should not be continued indefinitely.

All this is on the assumption that the apparently curdy masses in the stools are *really* curds. Sometimes very

similar lumps are due to an excess of fat in the food. Should frequent vomiting persist, and especially if this is of a decidedly sour nature, it is certainly probable that the percentage of fat in the mixture is too high and needs reduction. Vomiting may be considered as nearly always due originally to an excess of fat. If indigestion continue, yet loss of weight follows each general reduction of the strength of the milk mixture, it is probable that some entire change of the percentages must be made: stronger possibly in some respects, weaker in others, or with other more radical alterations.

These different modifications of the mixture may be made in various ways. We may select certain of the formulæ given, choosing those with low proteids or low fat, according as we believe the one or the other to be at fault, remembering always that it is the fat which is most liable to be the initial cause of vomiting, and the casein-element of the cow's milk which is very difficult of digestion and which develops most of the curd in the stool. When we have reason to think that the child cannot take any larger proportion of casein, yet certainly needs a stronger proteid food, we may make use of other proteids. One of the best of these is white of egg, which may be added in the form of egg-water instead of the plain water used in making the mixture. It cannot, of course, be sterilized, as it will coagulate. In other cases rennet-whey (Appendix, 15) may replace the water. This contains the lactalbumin of the cow's milk, and consequently does not produce the curd which casein does (p. 138). In making whey the casein has been removed by the coagulating action of the rennet. Whey mixtures may be pasteurized, but must not be raised to a higher temperature.

A small amount of vegetable proteid is added to a

milk mixture when barley or wheaten gruel is mixed with the food, and especially if a gruel of bean flour or pea flour is used. There are often reasons, however, which prevent the use of these gruels for this purpose alone, and the mother can better depend temporarily on egg-water or whey.

When we would like to increase the fat of the food, yet cannot do so without the production of troublesome vomiting, which, perhaps, invariably develops when the increase is attempted, we can sometimes manage to a certain extent by an increase of sugar, which replaces to a considerable degree the heat-producing power of the fat. The best method of adding sugar is in the form of a freshly malted preparation of starch. Malt extracts have the property of wholly or partially transforming starch into sugar. If we make a thick starchy gruel, prepared by boiling four level tablespoonfuls of barley flour or arrow-root in 1 pint of water in a double boiler to prevent scorching, we may transform this to a large extent by adding to it a concentrated malt extract, such as Maltine or Cereo, in the proportion of about 1 part or less of the extract to 9 parts of the gruel. This should be stirred at a temperature of about 120° F. (not more) for ten or fifteen minutes. This is often an excellent addition to an infant's food, avoids the danger which attends the numerous malted foods and starch preparations on the market, and increases the nutrition of the infant greatly. Sometimes, however, it has a too laxative action.

In some cases, where vomiting is most obstinate whenever milk is given, success is attained with a mixture of small amounts of malted barley flour or wheat flour with egg-water or egg-whey (Appendix, 16). This food contains a very digestible proteid combined with malted starch, but has no fat or curd of cow's milk, both of

which are often hard to digest. It is a tissue builder and a heat producer, and thus satisfies the requirements. At the same time as it is not a natural food it is intended to be only a temporary one. When it is well tolerated, the gradual addition of a little skimmed milk or "bottom-milk" can be tried. This, being practically free from fat, is often retained by the stomach. Later whole milk or cream is added.

The persistence of diarrhœa is often troublesome, and may require medication or perhaps a change in the food. Excess of either fat, proteids, or sugar may produce it.

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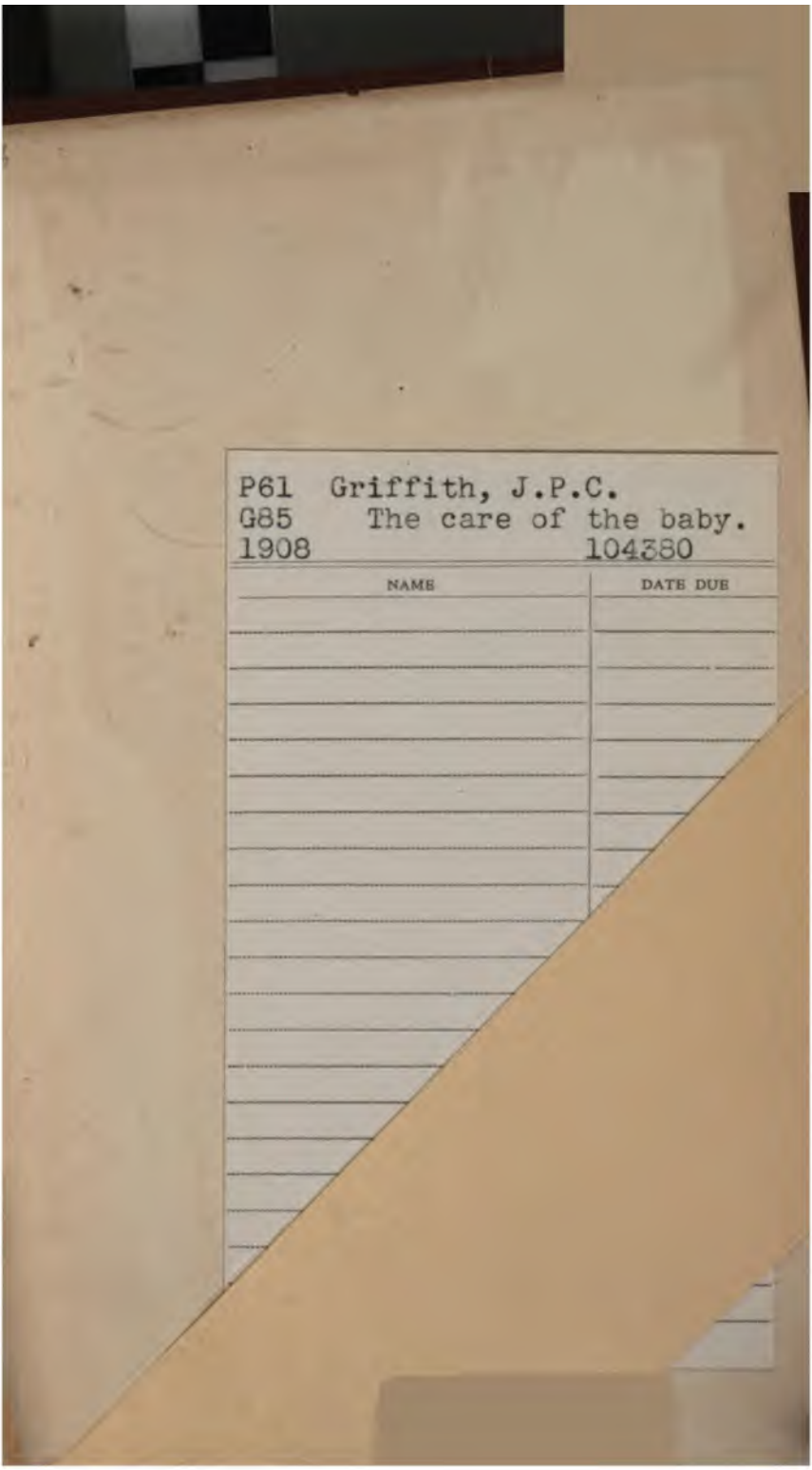
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